Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

Running title: Maternal BMI and post-term birth

Word count: 4922

Keywords: pregnancy, maternal, post-term, gestational age, obesity, BMI

Authors:

Nicola Heslehurst, PhD, Institute of Health & Society, Newcastle University

Rute Vieira, PhD, Institute of Health & Society, Newcastle University

Louise Hayes, PhD, Institute of Health & Society, Newcastle University

Lisa Crowe, PhD, Institute of Health & Society, Newcastle University

Dan Jones, MSc, Institute of Health & Society, Newcastle University

Shannon Robalino, MSc, Institute of Health & Society, Newcastle University

Emma Slack, MSc, Institute of Health & Society, Newcastle University

Judith Rankin, PhD, Institute of Health & Society, Newcastle University

Corresponding Author: Dr Nicola Heslehurst, Lecturer/NIHR Postdoctoral Research Fellow, Institute of Health & Society, Newcastle University, Baddiley-Clark Building, Richardson Road, Newcastle upon Tyne, UK, NE2 4AX, Tel: +44 0191 208 3823, Email: nicola.heslehurst@ncl.ac.uk

Acknowledgements: All authors contributed to the design of the research, acquisition of data and writing of the manuscript. NH and JR obtained funding. NH, RV and LH carried out the analysis. The authors would like to acknowledge Dr Helen Simpson at South Tees Hospitals NHS Foundation Trust, and Dr Helene Brandon at Gateshead NHS Foundation Trust, for their contribution to the clinical relevance and interpretation of this study. Dr Simpson and Dr Brandon are Consultant Obstetricians with a special interest in maternal obesity and risk management.

Conflict of Interest: This research was part funded by a Medical Research Council and Newcastle University Faculty of Medical Sciences Doctoral Training award for ES. The funders had no role in design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

Dr. Heslehurst has nothing to disclose.

Dr. Vieira has nothing to disclose.

Dr. Hayes has nothing to disclose.

Dr. Crowe has nothing to disclose.

Mr. Jones has nothing to disclose.

Ms. Robalino has nothing to disclose.

Ms. Slack has nothing to disclose.

Prof. Rankin has nothing to disclose.

Abstract

Background: Post-term birth is a preventable cause of perinatal mortality and severe morbidity. This review examined the association between maternal BMI and post-term birth at ≥42 and ≥41 weeks' gestation.

Methods: Six databases, reference lists and citations were searched May-November 2015. Observational studies published in English since 1990 were included. Linear and nonlinear dose-response meta-analyses were conducted using random effects models. Sensitivity analyses assessed robustness of the results. Meta-regression and sub-group meta-analyses explored heterogeneity. Obesity classes were defined as I (30.0-34.9kg/m^2), II (35.0-39.9kg/m^2), and III (≥40kg/m^2; IIIa 40.0-44.9kg/m^2, IIIb ≥45.0kg/m^2).

Results: Searches identified 16,375 results; 39 studies met the inclusion criteria (n=4,143,700 births). A nonlinear association between maternal BMI and births ≥42 weeks was identified, ORs and 95% CIs for obesity classes I-IIIb were 1.42 (1.27-1.58), 1.55 (1.37-1.75), 1.65 (1.44-1.87) and 1.75 (1.50-2.04) respectively. BMI was linearly associated with births ≥41 weeks: OR 1.13 (95% CI 1.05-1.21) for each 5 unit increase in BMI.

Conclusions: The strength of the association between BMI and post-term birth increases with increasing BMI. Odds are greatest for births ≥42 weeks among class III obesity. Targeted interventions to prevent the adverse outcomes associated with post-term birth should consider the difference in risk between obesity classes.

Abbreviations:

BMI	body mass index
OR	odds ratio
CI	confidence interval
IQR	inter quartile range
RR	relative risk

Introduction

Post-term birth is a preventable cause of intra-uterine death, stillbirth, neonatal and infant death[1-4]. Post-term birth contributes to severe morbidities for the mother and child, including macrosomia, shoulder dystocia, birth injury, fourth degree perineal laceration, fetal compromise, antenatal and postpartum haemorrhage, fetal dysmaturity, labour >24 hours, and newborn respiratory distress syndrome[1, 5-7]. There is emerging evidence that primiparous women who deliver post-term have an increased risk of developing Type 2 Diabetes in later life[8]. Costly obstetric and neonatal interventions associated with post-term birth include caesarean section, induction of labour, operative vaginal delivery, close fetal monitoring beyond term, ventilator use and neonatal intensive care admission[1, 7, 9]. The risks associated with post-term birth have historically been under-estimated due to self-reported assessment of gestational age relying on last menstrual period. This self-report assessment over-estimates post-term prevalence, resulting in an underestimate of the risks of "true" post-term birth due to lower-risk "term" births being misclassified as post-term[1, 4, 6]. Current wide-spread use of ultrasound scan technology provides a more accurate estimation of gestational age[10], and allows exploration of the "true" post-term risks.

Maternal obesity (i.e. pre-pregnancy body mass index (BMI) ≥30kg/m^2) impacts on daily clinical practice due to the international rise in its prevalence, and the complexity of its comorbidities. Maternal obesity is a complex condition strongly associated with socio-economic status and ethnicity inequalities[11, 12], making it a public health priority in addition to being a priority area for clinical practice. For example, socio-economic status varies between obesity classes, and pregnant women in the highest obesity class (class III, BMI≥40kg/m^2) are significantly more likely to reside in deprived locations (OR 4.7, 95% CI 3.2-6.9) compared with women in obesity class I (BMI 30.0-34.9kg/m^2)(OR 2.2, 95% CI 2.1-2.3)[11]. Disparities are also seen with maternal employment status. Pregnant women with a BMI in class I are more likely to be employed, while those in class III are more likely to be unemployed[11]. Obesity-associated adverse pregnancy outcomes for the mother and child include poorer mental health[13], gestational diabetes[14], congenital anomalies[15], and perinatal mortality[2, 16]. Pre-pregnancy weight is the most significant modifiable risk factor for stillbirth, with up to 100% increased

risk for women with obesity[22]. There is increasing evidence that maternal BMI influences gestational age at delivery. Robust meta-analysis data demonstrates the relationship between BMI and pre-term birth[17, 18]. Despite published studies exploring the association between maternal BMI and post-term birth[19-21], there is a lack of robust evidence from meta-analyses.

Both maternal obesity and post-term birth are preventable, and therefore warrant intervention to prevent associated adverse outcomes. Challenges to investigating maternal obesity and post-term birth include interventions to expedite birth, such as induction of labour and caesarean section, interrupting the natural gestation trajectory. There are differences in the definitions used to classify post-term in existing literature, including pregnancies progressing beyond 40, 41, or 42 weeks gestation [4, 6]. Although there is evidence of significantly increased risks for each definition of post-term beyond 40 weeks [22], the greatest risk is among the gestations >42 weeks for most adverse outcomes [9]. The terminology post-term and prolonged pregnancy are also used interchangeably to describe gestational ages beyond term [4].

Investigation of the association between maternal obesity and post-term birth adds additional complexity. Maternal obesity is associated with a significantly increased risk of developing the comorbidities which lead to early intervention and disrupt the natural pregnancy trajectory, including gestational diabetes and preeclampsia[14, 22]. In addition, the BMI definitions used to categorise maternal weight status are used inconsistently, contributing to difficulty of interpretation when making direct comparisons of studies. The World Health Organisation criteria for categorising BMI are <18.5kg/m^2 (underweight), 18.5-24.9kg/m^2 (recommended weight), 25.0-29.9kg/m^2 (overweight), and ≥30.0kg/m^2 (obese); with further obesity sub-classes of class I 30.0-34.9kg/m^2, class II 35.0-39.9kg/m^2, and class III ≥40kg/m^2 obesity[23]. For Asian populations, the BMI criteria are reduced (recommended weight 18.5-23kg/m^2, overweight 23-27.5kg/m^2, and obese >27.5kg/m^2) due to increased risk of metabolic diseases at a lower BMI[24]. However, the Asian-specific definitions for weight status are not consistently adopted internationally in research or clinical guidelines.

Overcoming the methodological challenges to establish the relationship between BMI and post-term birth is important to inform strategies for preventing associated adverse outcomes, such as perinatal mortality and severe morbidity. Additionally, identification of the dose-response association would inform preconception and antenatal healthcare planning, practice and guidelines such as risk communication and shared decision making for intervention options for targeted groups of women based on BMI. This systematic review and meta-analyses aimed to establish the strength of the association between maternal obesity and post-term birth. It specifically investigated the dose-response association between BMI and post-term birth, taking into consideration the methodological challenges, confounding and sources of heterogeneity in the existing research.

Methods

Search strategies for systematic reviews of observational epidemiological studies require multiple components as database searches alone have been shown to only identify up to half of the relevant literature[25]. Systematic exclusion of studies through following an inadequate search strategy increases the risk of publication bias. Therefore a six stage search strategy was followed in an attempt to limit the effect of publication bias arising from searching literature databases alone.

Stage 1: Databases were searched using keywords and study filters for non-RCT studies. Restrictions to human studies were included. Search terms and subject headings were developed for MEDLINE (fig. 1), and translated across four additional databases: British Nursing Index, CINAHL, Embase, and PsycInfo (fig. S1).

Stage 2: The reference lists of all included studies, and all related systematic reviews identified in stage 1, were hand searched.

Stage 3: Citation searches for all included studies were performed using Google Scholar citations function.

Stage 4: Authors of relevant published abstracts were contacted to identify if there had been subsequent full publication of studies.

Stage 5: Any additional studies identified in stages 2-4 were subject to further reference list and citation searching. Stages 2-5 continued until no further new studies were identified.

Stage 6: Authors of included studies were contacted for additional data when required for inclusion in the meta-analyses.

Inclusion criteria were peer reviewed full studies (i.e. not abstracts, editorials etc), published in the English language, since 1st January 1990. Studies had to report both the exposure variable (maternal weight status) and the outcome variable (post-term birth). The six stage search strategy was carried out between May and November 2015. Screening titles, abstracts and full papers for inclusion in the review was carried out by two researchers independently. Data extraction and quality assessment were also carried out independently by two researchers using a standardised protocol for data extraction (table S1), and the Newcastle-Ottawa scale for cohort studies for quality assessment (fig S2). Independent extractions and assessments were combined and agreed. A third researcher was available for any disagreements (not required).

In circumstances where there were missing or unclear definitions for the exposure or outcome variables, missing frequency data, the authors were contacted for clarification. If authors did not respond to the request for further information after follow up email requests, or if the authors could not be contacted for any reason, then assumptions about the definitions were made based on the information provided in the papers. For example, if the study described that they had compared post-term (defined as ≥42 weeks) and pre-term (defined as <37 weeks) with term (undefined), then the assumption was made that term was defined as the gestational age between the reported post- and pre-term (37 to 41+6 weeks). Alternative methods of making assumptions included searching for definitions in papers that the authors had referenced in relation to gestational age or BMI, and searching for any publications by the same authors on a similar topic where they had defined the variables. In the absence of any information to inform our assumptions following these methods, the terminology used by the authors was used to define the exposure and outcomes variables. For

example, if the authors used the term “normal BMI” then the WHO criteria of 18.5-24.9 kg/m^2 was assumed.

For the purposes of this systematic review, we categorised post-term birth into two outcome variables which were analysed separately. The primary outcome was post-term birth ≥42 weeks gestation as this gestation incurs the greatest risk associated with post-term birth, and the secondary outcome was post-term birth ≥41 weeks gestation as this gestation also has increased risk but to a lesser extent than 42 weeks. Dose-response meta-analyses were conducted to investigate the association between maternal BMI and both outcomes. The study-specific linear trends (odds ratios (ORs) for continuous BMI assuming linearity) were derived using the method by Greenland and Longnecker[26]. This method requires the ORs with confidence intervals (CIs) for at least two exposure categories (including the reference group), and the number of cases and participants in each exposure category. If the adjusted ORs and CIs were not available, the respective unadjusted parameters were derived from the data, and used in the meta-analysis. To assess the effect of including adjusted and unadjusted ORs in the meta-analysis, subgroup meta-analyses were performed with the studies that reported both adjusted and unadjusted ORs (or provided data to enable unadjusted ORs to be calculated), and the statistical significance and direction of the associations were compared. For each exposure category, the midpoint was calculated as the average of the lower and upper bound, and the respective OR was assigned to each midpoint. As the BMI midpoint was required for these analyses, upper and lower cutoffs were applied to open ended BMI categories in increments of 5 BMI units (e.g. for BMI<18.5kg/m^2 a 5 BMI unit lower limit of 13.5kg/m^2 was applied; the respective midpoint was 16kg/m^2). The regression coefficient for a change of 5 BMI units (log OR_{5BMI}) is a function of the coefficient estimated when assuming a change of 1 BMI unit (log OR_{BMI}), such that log OR_{5BMI} = 5 x log OR_{BMI}. The summary ORs were calculated using the random effects model by DerSimonian and Laird[27].

A two-stage, random-effects, nonlinear dose-response meta-analysis[28, 29] was also conducted to assess potential nonlinear associations, using cubic splines regression to model maternal BMI. The first

stage involved fitting a cubic spline model with two spline transformations, accounting for the correlation within each set of published ORs. The two regression coefficients were combined, and the variance/covariance matrices estimated for each study using a random-effects meta-analysis. Nonlinearity was assessed by testing that the coefficient of the second spline was equal to zero[30]. This method required ORs with CIs to be available for at least three exposure (BMI) categories, as when only two categories are reported (e.g. recommended BMI and obese BMI), information on how the outcome behaves between the two categories is not available and nonlinearity cannot be assessed. Therefore, studies reporting data for only two BMI categories were excluded from the nonlinear analyses.

Publication bias was tested for using Eggers test[31]. A 2-sided *p*-value <0.05 was considered statistically significant. Sensitivity analyses were performed by systematically excluding one study at a time from the meta-analysis. Meta-regression and sub-group meta-analyses were carried out to explore factors identified *a-priori* as being potentially important sources of heterogeneity. *A-priori* clinical factors were the method of assessment of the exposure and outcome variables (maternal weight and gestational age at delivery), and consideration of the clinical confounders which impact on gestational age at delivery (induction of labour, elective caesarean section, parity, gestational diabetes, hypertension and pre-eclampsia). No studies were excluded from the overall meta-analysis based on methodological factors such as quality. However, methodological factors, including quality as well as study size, geography, quality, age and duration of the data included, study design (e.g. retrospective or prospective, number of exposure categories, adjusted data), and how studies were identified for inclusion in the review were explored by meta-regression and sub-group meta-analysis . Heterogeneity among studies was evaluated using the I^2 statistic[32] with a threshold of >75% representing considerable heterogeneity[33]. The statistical analyses were conducted using Stata version 13.1. Studies which met the inclusion criteria but did not present data suitable for inclusion in the meta-analyses are summarised narratively. The systematic review was registered on the PROSPERO database (reference CRD42015014164).

Results

Searches identified 16,375 studies, of which 39 met the inclusion criteria, giving a total population of 4,143,700 births (fig. 2, table S2 for detailed information on screening). Of the included studies, 24 (62%) were identified through database searches and 15 (38%) by searching reference lists and citations. Contacting authors of published abstracts did not identify any additional eligible studies. Of the 39 included studies, 26 reported data for post-term birth ≥42 weeks, and 14 reported ≥41 weeks (see table 1 for summary of included studies, Table S3 for additional detail). Some studies provided data for both definitions of post-term (table 1). Twenty studies were from Europe, five each from the USA and Middle East, four from Asia, three from Canada, and one each from South Africa and Australia. Most studies were published between 2005 and 2014 (n=33). Additional information was requested from the authors on definitions used (e.g. BMI or gestational age categories), or frequencies (e.g. number of cases or controls) for 34 studies (table S4). The quality of studies ranged from a score of one to eight, with a median quality score of four (table 1, and table S4 for detailed quality assessment results).

There was negligible influence of using unadjusted or adjusted ORs in the analysis of either post-term birth categories with a difference in OR of 0.03 when comparing adjusted and unadjusted data from the same studies (fig. S3). Therefore, adjusted ORs were used when reported, and unadjusted ORs in the absence of adjusted data. One study used the Asian specific BMI reference criteria[34]. These data were transformed to represent the general population BMI criteria with no influence on the overall effect size (fig. S4).

Nineteen studies reported data that could be pooled for meta-analysis of post-term birth ≥42 weeks, and 11 studies reported data for post-term birth ≥41 weeks (some studies reported multiple outcomes). Data from 10 studies could not be included in the meta-analysis and a narrative summary is provided for the results of these studies.

Meta-analyses of post-term birth ≥42 weeks gestation

The 19 studies with data for ≥42 weeks meta-analysis, included 201,396 cases among 2,501,803 pregnancies (8.1% incidence). In the dose-response analysis, the OR for each 5 unit increase or decrease in BMI compared with the reference BMI midpoint (22kg/m^2) was 1.19 (95% CI 1.12-1.26; heterogeneity I^2=98.1%, p<0.001) (fig. 3a). There was evidence of a nonlinear association (p=0.002, table S6a, fig. 3b) with a statistically significant decrease in odds of births ≥42 weeks for underweight BMI compared with the reference group, and an increase for overweight and obese BMIs (table 2). The odds of birth ≥42 weeks increased within obesity classes, with 42%, 55%, 65% and 75% increased odds for BMI classes I, II, IIIa and IIIb respectively (table 2). There was no evidence of publication bias in the analyses of births ≥42 weeks (p=0.60, table S7).

Meta-analyses of post-term birth ≥41 weeks gestation

The 11 studies with data for the meta-analysis of births ≥41 weeks included 70,334 cases among 444,706 pregnancies (15.8% incidence). In the dose-response analysis, the OR for each 5 unit increase or decrease in BMI compared with the reference BMI midpoint was 1.13 (95% CI 1.05-1.21; heterogeneity I^2=94%, p<0.001) (fig. 4a). Linearity of association between maternal BMI and birth ≥41 weeks is not rejected (p=0.23, table S6b). Assuming a linear association, this suggests a statistically significant decrease in odds of births ≥41 weeks for underweight BMI compared with the reference group, and an increase for overweight and obese BMIs (table 2, fig. 4b). This increasing linear association was also observed within the obesity classes, although to a lesser extent than for births ≥42 weeks (26%, 39%, and 52% increased odds for classes I, II, and III respectively) (table 2). There was no evidence of publication bias in the analyses of births ≥41 weeks (p=0.16, table S7).

Sensitivity and heterogeneity analyses

Sensitivity analyses did not show any significant influence on linearity of any individual studies in the linear analyses for either post-term categories (tables S8 and S9), or in the nonlinear analysis for births ≥42 weeks (table S8). For births ≥41 weeks, the sensitivity analyses for the nonlinear model detected

that data from one study[35] had an influence on linearity of the association between post-term birth and maternal BMI (table S9 and fig. S5). The inclusion of data from all studies visually appeared to be nonlinear (fig. S5); however, nonlinearity was not statistically significant (p=0.065, table S6c). When the data from this one study which was influencing linearity[35] were removed, the results showed a linear trend (fig. 4b).

Meta-regression exploring potential sources of heterogeneity identified that adjusting for the number of BMI exposure categories had the greatest influence on overall heterogeneity for births ≥42 weeks (I^2 reduced by 22.2%, from 98.1 to 75.95%, table S10). Adjusting for additional variables in the meta-regression did not have a substantial impact on overall heterogeneity for either post-term outcomes. Sub-group meta-analyses for post-term birth ≥42 weeks, identified a significant reduction in heterogeneity (I^2 <75%, p>0.05, ≥3 studies) in the following categories: having three or four exposure categories, sample size between 1,000-10,000, controlling for induction of labour or caesarean delivery, and controlling for hypertension or pre-eclampsia (table S10). The most relevant influence on heterogeneity in the sub-group meta-analyses of births ≥41 weeks was having four exposure categories (table S11).

Narrative summary of papers not included in the meta-analysis

The 10 studies which had to be excluded from the meta-analyses due to a lack of comparable data for pooling included: two studies only reporting maternal weight and not BMI[36, 37], five did not report frequency data for participants and/or cases of post-term birth[21, 38-41], and three did not have comparable BMI reference groups (one combined all non-obese[42]; one combined underweight and recommended weight[43]; and one combined recommended weight and overweight[44]). Of the ten studies not included in the meta-analyses, six found a significantly increased risk of post-term birth in obese women compared to the reference group[21, 37-40, 44], while four did not find a significantly increased association[36, 41-43] (table 3).

Discussion

This systematic review and meta-analysis of over 4 million births has identified a significantly increasing association between maternal BMI and post-term birth. This association increases in strength as BMI increases, with a substantial difference in effect size between obesity classifications: a difference of 33% in odds of post-term birth ≥42 weeks, and 26% for ≥41 weeks when comparing obesity classes I and III. This substantial increase in post-term birth and associated risks for mothers in the highest obesity class presents a double burden of inequality. Women facing the greatest socio-economic disadvantage[11] also have the highest level of pregnancy-related risk, confirming that maternal obesity is both a clinical and public health priority for the wellbeing of women and their babies.

The mechanisms linking maternal BMI and post-term birth are not fully understood. The onset of labour involves mechanical and hormonal interactions between the mother, fetus and placenta. The exact causal pathways remain unclear and much of the evidence is based on animal models. This evidence suggests a number of potential mechanisms. Hormones are thought to play a key role in the pathway, including corticotrophin-releasing hormone, oestrogen, progesterone, prostaglandins and oxytocin[45]. Additionally, it is well established that women with obesity have increased inflammation, circulating leptin concentrations, insulin resistance, lipolysis, and dyslipidaemia. These metabolic abnormalities have been hypothesised to influence the onset of spontaneous or oxytocin-induced labour and uterine contractility[45]. There is also evidence from one study in humans that shows that women with diabetes (including type 1 diabetes and gestational diabetes) had significantly reduced spontaneous myometrial contractility compared with women without diabetes, even after stimulation with oxytocin[46]. Uterine biopsies identified reduced calcium channel expression and signalling among women with diabetes, and the authors concluded that this was likely to account for the reduced contractility in addition to a small but significant difference in myometrial mass[46]. As obesity and diabetes are closely related, further exploration of myometrial contractility between women of different weight status' could provide further evidence for causal mechanisms of post-term birth and obesity.

The heterogeneity in the relationship between degree of obesity and risk of post-term birth is an important message for researchers, practitioners and policy makers. The implication of using one criteria to define the obese population is an attenuation of the true risk for the higher obesity classes. Despite the differences between obesity classes, pregnancy outcome data is often reported for one obese category. When pregnancy outcomes are reported by obesity class, a similar pattern is often reported. For example, the odds of pre-term birth were reported to increase two-fold from 1.6 (95% CI 1.4-1.8) for class I, to 3.0 (95% CI, 2.3-3.9) for class III obesity[47]. Similarly, the odds of GDM increased from 3.0 (95% CI 2.3 to 3.9) for class I, to 5.6 (95% CI 4.3 to 7.2) for class III obesity[14]. However, differentiating between obesity classes can be challenging. Although class III obesity is increasing at the most rapid rate over time[11] it only represents approximately 1% of pregnancies in the UK[11], and 4% in the USA[12]. For population data to be powered for statistical significance, the sample size needs to be sufficient to detect enough cases in each obesity class. Our sub-group meta-analyses suggests that 100 cases of post-term birth ≥42 weeks, and 1000 cases for ≥41 weeks are required to detect significance, which may not always be feasible, even in national-level datasets. When obesity classifications have to be combined for statistical power, there should be cautious interpretation of the results reflecting "obesity" without consideration of the heterogeneous nature of obesity classifications. Additionally, the use of Asian-specific rather than general population BMI criteria should be considered in future research. Although we did not identify any impact of using either definition on post-term birth in this review, our analyses were limited as only one study had utilised the Asian-specific criteria.

There are similar challenges with inconsistent use of post-term birth categories. Meta-analyses showed an increased association with maternal BMI and both post-term categories, and the highest odds for births ≥42 weeks. Although there is significantly increased risk for pregnancies progressing beyond 40 weeks[22], the greatest risk is in pregnancies with gestations ≥42 weeks[9], particularly for perinatal mortality and severe morbidities which require obstetric and neonatal intervention. Studies which combine post-term birth categories are likely to underestimate the level of risk associated with maternal BMI.

A key strength of this review is overcoming the methodological challenges of investigating post-term birth and maternal BMI. Analyses were performed throughout to explore the influence of methodological decisions, such as using unadjusted data and Asian-specific BMI categories. The conversion of categorical BMI was necessary due to limited reporting of directly comparable obesity categories: 17 studies combined data for obesity classes I-III[19, 34, 35, 38, 42-44, 48-57]; three reported obesity classes I-III separately[58-60]; four combined obesity classes I-II[20, 41, 61, 62]; six combined classes II-III[39, 40, 63-66]; seven had further inconsistent non-comparable categories such as combining overweight and obese[36, 37, 67-71]; and two studies did not define their BMI categories[21, 72]. The possible groups to combine for categorical analyses would have been further reduced when applying additional analysis criteria such as the gestational age stratification, definition of the reference BMI group etc. Therefore the conversion to continuous BMI allowed direct comparison of more studies overall than would have been possible using a categorical meta-analyses. To aid the interpretation of continuous BMI analyses, increments of 5 BMI units were used to allow back-translation to approximate WHO categories. This allows for international comparison with other published research on maternal BMI, and facilitates interpretation for clinical practice, public health and policy-maker decisions which have a tendency to utilise BMI categories.

A further strength of this systematic review is the rigorous search strategy. It has been demonstrated that database searches alone are not sufficient for epidemiology systematic reviews[25], and the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guidelines[73] recommend that additional searches may be necessary. We performed rigorous database searches including pilot and refinement of the search strategy by the research team, including an information scientist with expertise in database searching. This was supplemented by additional searches in our six stage search strategy to identify the full evidence-base. Among the studies identified using additional search methods, some were published in journals not indexed on the bibliographic databases and therefore would not have been identified by database searches alone. Furthermore, the post-term data presented in a number of studies was not a primary outcome, rather one outcome among multiple adverse pregnancy outcomes being investigated. These studies did not include the post-term search terms in the keywords, titles or

abstracts and therefore would not have been identified by any search strategy using these terms. This rigorous search strategy was time-consuming, although resulted in an absence of publication bias. The method of searching (i.e. database, reference list or citation searches) was an *a-priori* factor considered in the sub-group meta-analysis and meta-regression to explore sources of heterogeneity between studies. While the method of searching did not impact on overall heterogeneity, the subgroup analyses suggests that the inclusion of studies identified through database searches were more likely to show statistically significant results in meta-analysis than the studies identified by the additional searches (see table S10 for example of analysis on post-term ≥42 weeks). This result could have been due to more studies being included in the ≥42 weeks sub-group meta-analysis identified by database searches (n=12) compared with citation searches (n=4) or reference list searches (n=3). However, it could also suggest that database searches alone would result in positive publication bias by only identifying those studies more likely to show statistical significance. This result supports the MOOSE guidelines recommendation for supplementing database searches when carrying out systematic reviews of observational studies.

A limitation of systematic review methodology is reliance on the availability of published data which can impact on the analyses. The use of self-reported last menstrual period or measured ultrasound scan is an important clinical factor influencing the assessment of gestational age, yet five studies did not specify methods of assessment for the ≥42 weeks meta-analysis, and a further seven for ≥41 weeks. Meta-regression identified some factors considered to be important *a priori* which did not impact on the results, such as the use of self-report or measured BMI. The use of self-reported BMI among obese BMI groups is a frequent methodological criticism[74], yet had little influence in our meta-regression analyses. Others have reported that the error caused by self-report misclassification of BMI among overweight and obese women has minimal influence on the dose-response analyses for large for gestational age, gestational diabetes and preeclampsia[75]. Therefore, the potential under-reporting of self-reported BMI appears to have little influence on large-scale epidemiological analysis of maternal weight status and pregnancy outcomes. Additionally, 25 of the included studies did not report ethnicity of their population and therefore we could not explore this in the meta-regression or sub-group analysis

and makes the generalisability across ethnicities challenging. However, one quarter of the studies were from the Middle East, Asia or South Africa which suggests that there was some ethnic diversity present in the populations rather than data originating from mainly White populations. Of the studies that reported ethnicity, eight studies described their population as mainly White, one as all Asian, one as mainly African, and four described a mix of ethnic groups in the population. The meta-regression did explore country of study and this did not impact on overall heterogeneity of results.

Maternal obesity is increasing internationally, and the daily challenges for clinical and public health practice will also continue to increase. Results of this systematic review and meta-analyses add to the evidence-base of increased risks associated with maternal obesity, and can be used to inform preconception and pregnancy care. Policy makers should emphasise the importance of supporting women to reduce their BMI preconception and inter-pregnancy to prevent the adverse outcomes associated with post-term birth, such as perinatal and infant mortality. The increasing dose-response association also informs healthcare planning and commissioning of services, as the level and intensity of intervention required to prevent adverse outcomes associated with post-term birth will differ according to BMI class. The data can also be used to inform the need for interventions such as induction of labour and caesarean delivery to prevent pregnancies progressing to post-term. These procedures in obese populations also present clinical challenges and require increased planning, evidence-based risk communication and shared decision making about birth plans. Any steps taken to support the health and wellbeing of women and their babies in relation to post-term birth and associated risks should be informed by the dose-response association between the obesity classes. Further research which utilises maternal BMI should also consider the heterogeneity within obesity populations, and the need for adequately powered studies to explore pregnancy outcomes in the higher, less prevalent, obesity classes.

Conclusions

Maternal obesity is having a significant impact on daily clinical practice. The association between maternal BMI and post-term birth increases with increasing BMI, with the greatest odds among women in obesity class III and with post-term birth ≥42 weeks. Pregnancies which progress beyond 42 weeks have significantly increased risk of adverse outcomes, including perinatal mortality. This presents a double burden of disease among women with morbid obesity, which is also associated with the highest levels of socio-economic disadvantage compared with other BMI categories. Future maternal obesity research should consider the heterogeneity between obesity classes. Healthcare policy and practice should ensure that necessary interventions are in place to prevent the adverse outcomes associated with post-term birth, considering the increased risk among the higher obesity classes.

References

1 Spong CY. Defining "term" pregnancy: Recommendations from the defining "term" pregnancy workgroup. *JAMA*. 2013; 309: 2445-46.

2 Flenady V, Koopmans L, Middleton P, Frøen JF, Smith GC, Gibbons K*, et al.* Major risk factors for stillbirth in high-income countries: a systematic review and meta-analysis. *The Lancet*. 2011; 377: 1331-40.

3 Caughey AB, Musci TJ. Complications of term pregnancies beyond 37 weeks of gestation. *Obstetrics & Gynecology*. 2004; 103: 57-62.

4 Shea KM, Wilcox AJ, Little RE. Postterm delivery: a challenge for epidemiologic research. *Epidemiology*. 1998; 9: 199-204.

5 Mandruzzato G, Alfirevic Z, Chervenak F, Gruenebaum A, Heimstad R, Heinonen S*, et al.* Guidelines for the management of postterm pregnancy. *Journal of Perinatal Medicine*. 2010; 38: 111-19.

6 Caughey AB, Snegovskikh VV, Norwitz ER. Postterm pregnancy: how can we improve outcomes? *Obstetrical & Gynecological Survey*. 2008; 63: 715-24.

7 Caughey AB, Bishop JT. Maternal complications of pregnancy increase beyond 40 weeks of gestation in low-risk women. *Journal of Perinatology*. 2006; 26: 540-45.

8 James-Todd TM, Karumanchi SA, Hibert EL, Mason SM, Vadnais MA, Hu FB*, et al.* Peer Reviewed: Gestational Age, Infant Birth Weight, and Subsequent Risk of Type 2 Diabetes in Mothers: Nurses' Health Study II. *Preventing Chronic Disease*. 2013; 10.

9 Caughey AB, Stotland NE, Washington AE, Escobar GJ. Maternal and obstetric complications of pregnancy are associated with increasing gestational age at term. *American Journal of Obstetrics and Gynecology*. 2007; 196: 155. e1-55. e6.

10 Caughey AB, Nicholson JM, Washington AE. First- vs second-trimester ultrasound: the effect on pregnancy dating and perinatal outcomes. *American Journal of Obstetrics & Gynecology*. 2008; 198: 703.e1-03.e6.

11 Heslehurst N, Rankin J, Wilkinson JR, Summerbell CD. A Nationally Representative Study of Maternal Obesity in England, UK: Trends in Incidence and Demographic Inequalities in 619 323 Births, 1989-2007. *International Journal of Obesity*. 2010; 34: 420-28.

12 Fisher SC, Kim SY, Sharma AJ, Rochat R, Morrow B. Is obesity still increasing among pregnant women? Prepregnancy obesity trends in 20 states, 2003–2009. *Preventive Medicine*. 2013; 56: 372-78.

13 Molyneaux E, Poston L, Ashurst-Williams S, Howard LM. Obesity and Mental Disorders During Pregnancy and Postpartum: A Systematic Review and Meta-analysis. *Obstetrics & Gynaecology*. 2014; 123: 857-67.

14 Torloni MR, Betrán AP, Horta BL, Nakamura MU, Atallah AN, Moron AF*, et al.* Prepregnancy BMI and the risk of gestational diabetes: a systematic review of the literature with meta-analysis. *Obesity Reviews*. 2008; 10: 194–203.

15 Stothard KJ, Tennant PWG, Bell R, Rankin J. Maternal Overweight and Obesity and the Risk of Congenital Anomalies: A Systematic Review and Meta-analysis *JAMA*. 2009; 301: 636-50.

16 Aune D, Saugstad O, Henriksen T, Tonstad S. Maternal body mass index and the risk of fetal death, stillbirth, and infant death: A systematic review and meta-analysis. *JAMA*. 2014; 311: 1536-46.

17 McDonald SD, Han Z, Mulla S, Beyene J. Overweight and obesity in mothers and risk of preterm birth and low birth weight infants: systematic review and meta-analyses. *BMJ*. 2010; 341.

18 Torloni MR, Betran AP, Daher S, Widmer M, Dolan SM, Menon R*, et al.* Maternal BMI and preterm birth: A systematic review of the literature with meta-analysis. *The Journal of Maternal-Fetal and Neonatal Medicine*. 2009; 22: 957-70.

19 Halloran DR, Cheng YW, Wall TC, Macones GA, Caughey AB. Effect of maternal weight on postterm delivery. *Journal of Perinatology*. 2012; 32: 85-90.

20 Khashan AS, Kenny LC. The effects of maternal body mass index on pregnancy outcome. *European Journal of Epidemiology*. 2009; 24: 697-705.

21 Caughey AB, Stotland NE, Washington AE, Escobar GJ. Who is at risk for prolonged and postterm pregnancy? *American Journal of Obstetrics & Gynecology*. 2009; 200: 683. e1-83. e5.

22 Greve T, Lundbye-Christensen S, Nickelsen CN, Secher NJ. Maternal and perinatal complications by day of gestation after spontaneous labor at 40–42 weeks of gestation. *Acta Obstetricia et Gynecologica Scandinavica*. 2011; 90: 852-56.

23 World Health Organisation. Obesity: Preventing and Managing the Global Epidemic. WHO: Geneva 2004.

24 World Health Organisation. Expert consultation: Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet*. 2004; 363: 157-63.

25 Chalmers I, Dickersin K, Chalmers TC. Getting to grips with Archie Cochrane's agenda. *BMJ*. 1992; 305: 786-88.

26 Greenland S, Longnecker MP. Methods for trend estimation from summarized dose-response data, with applications to meta-analysis. *American Journal of Epidemiology*. 1992; 135: 1301-09.

27 DerSimonian R, Laird N. Meta-analysis in clinical trials. *Control Clinical Trials*. 1986; 7: 177-88.

28 Orsini N, Bellocco R, Greenland S. Generalized least squares for trend estimation of summarized dose-response data. *Stata J*. 2006; 6: 40-57.

29 Orsini N, Li R, Wolk A, Khudyakov P, Spiegelman D. Meta-analysis for linear and nonlinear dose-response relations: Examples, an evaluation of approximations, and software. *American Journal of Epidemiology*. 2012; 175: 66-73.

30 Desquilbet L, Mariotti F. Dose-response analyses using restricted cubic spline functions in public health research. *Statistics in Medicine*. 2010; 29: 1037-57.

31 Egger M, Smith GD, Schneider M, C. M. Bias in meta-analysis detected by a simple, graphical test. *BMJ* 1997; 315: 629-34.

32 Higgins JP, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine*. 2002; 21: 1539-58.

33 Higgins JPT, Green S. Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. The Cochrane Collaboration: Available from www.cochrane-handbook.org 2011.

34 Leung TY, Leung TN, Sahota DS, Chan OK, Chan LW, Fung TY*, et al.* Trends in maternal obesity and associated risks of adverse pregnancy outcomes in a population of Chinese women. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2008; 115: 1529-37.

35 Lumme R, Rantakallio P, Hartikainen AL, Jarvelin MR. Pre-pregnancy weight and it's relation to pregnancy outcome. *Obstetrics & Gynaecology*. 1995; 15: 69-75.

36 Sharief M, Tarik A. Obesity in pregnancy. *Qatar Medical Journal*. 2000; 9: 48-50.

37 Robinson H, O'Connell C, Joseph K, McLeod N. Maternal outcomes in pregnancies complicated by obesity. *Obstetrics & Gynecology*. 2005; 106: 1357–64.

38 Briese V, Voigt M, Wisser J, Borchardt U, S. S. Risks of pregnancy and birth in obese primiparous women: an analysis of German perinatal statistics. *Archives of Gynecology and Obstetrics*. 2011; 283: 249-53.

39 Denison FC, Price J, Graham C, Wild S, Liston WA. Maternal obesity, length of gestation, risk of postdates pregnancy and spontaneous onset of labour at term. *BJOG: An International Journal of Obstetrics and Gynaecology*. 2008; 115: 720-25.

40 Kistka ZAF, Palomar L, Boslaugh SE, DeBaun MR, DeFranco EA, Muglia LJ. Risk for postterm delivery after previous postterm delivery. *American Journal of Obstetrics& Gynecology*. 2007; 196: 241.e1-41.e6.

41 Abenhaim HA, Kinch RA, Morin L, Benjamin A, Usher R. Effect of prepregnancy body mass index categories on obstetrical and neonatal outcomes. *Archives of Gynecology & Obstetrics*. 2007; 275: 39-43.

42 Al-Rayyan E, Shwayat R, AL-Sumadi A, AL-Ghwyri A, Beni Meri Z, Massadeh M*, et al.* The Effect of High Maternal Body Mass Index before Pregnancy on Pregnancy Outcome. *Journal of the Royal Medical Services*. 2010; 17: 11-15.

43 Mancuso A, D'Anna R, Leonardi R. Pregnancy in the obese patient. *European Journal of Obstetrics and Gynecology and Reproductive Biology*. 1991; 39: 83-86.

44 Usha Kiran TS, Hemmadi S, Bethel J, Evans J. Outcome of pregnancy in a woman with an increased body mass index. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2005; 112: 768-72.

45 Bogaerts A, Witters I, Van den Bergh BR, Jans G, Devlieger R. Obesity in pregnancy: altered onset and progression of labour. *Midwifery*. 2013; 29: 1303-13.

46 Al-Qahtani S, Heath A, Quenby S, Dawood F, Floyd R, Burdyga T*, et al.* Diabetes is associated with impairment of uterine contractility and high Caesarean section rate. *Diabetologia*. 2012; 55: 489.

47 Cnattingius S, Villamor E, Johansson S, et al. Maternal obesity and risk of preterm delivery. *JAMA*. 2013; 309: 2362-70.

48 Arora R, Arora D, Patumanond J. Adverse pregnancy outcomes in women with high pre-pregnancy body mass index. *Open Journal of Obstetrics and Gynecology*. 2013; 3: 285-91.

49 Cedergren MI. Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstetrics & Gynecology*. 2004; 103: 219-24.

50 El-Gilany AH, Hammad S. Body mass index and obstetric outcomes in pregnant in Saudi Arabia: A prospective cohort study. *Annals of Saudi Medicine*. 2010; 30: 376-80+421.

51 Johnson JW, Longmate JA, Frentzen B. Excessive maternal weight and pregnancy outcome. *American Journal of Obstetrics & Gynecology*. 1992; 167: 353-70

52 Morgan KL, Rahman MA, Hill RA, Zhou S-M, Bijlsma G, Khanom A*, et al.* Physical Activity and Excess Weight in Pregnancy Have Independent and Unique Effects on Delivery and Perinatal Outcomes. *PLoS ONE*. 2014; 9: e94532.

53 Raatikainen K, Heiskanen N, Heinonen S. Transition from Overweight to Obesity Worsens Pregnancy Outcome in a BMI-dependent Manner. *Obesity* 2006; 14: 165-71.

54 Rode L, Nilas L, Wojdemann K, Tabor A. Obesity-related complications in Danish single cephalic term pregnancies. *Obstetrics & Gynecology*. 2005; 105: 537-42.

55 Roos N, Sahlin L, Ekman-Ordeberg G, Kieler H, Stephansson O. Maternal risk factors for postterm pregnancy and cesarean delivery following labor induction. *Acta Obstetricia et Gynecologica Scandinavica*. 2010; 89: 1003-10.

56 Stotland NE, Washington AE, Caughey AB. Prepregnancy body mass index and the length of gestation at term. *American Journal of Obstetrics & Gynecology*. 2007; 197: 378.e1-78.e5.

57 Vinturache A, Moledina N, McDonald S, Slater D, Tough S. Pre-pregnancy Body Mass Index (BMI) and delivery outcomes in a Canadian population. *BMC Pregnancy & Childbirth*. 2014; 14: 1-10.

58 Arrowsmith S, Wray S, Quenby S. Maternal obesity and labour complications following induction of labour in prolonged pregnancy. *BJOG: An International Journal of Obstetrics and Gynaecology*. 2011; 118: 578-88.

59 Scott-Pillai R, Spence D, Cardwell CR, Hunter A, Holmes VA. The impact of body mass index on maternal and neonatal outcomes: A retrospective study in a UK obstetric population, 2004-2011. *BJOG: An International Journal of Obstetrics and Gynaecology*. 2013; 120: 932-39.

60 Vaswani PR, Balachandran L. Pregnancy outcomes in a population with high prevalence of obesity: How bad is it? *Clinical Epidemiology and Global Health*. 2013; 1: 5-11.

61 Basu JK, Jeketera CM, Basu D. Obesity and its outcomes among pregnant South African women. *International Journal of Gynecology and Obstetrics*. 2010; 110: 101-04.

62 Schrauwers C, Dekker G. Maternal and perinatal outcome in obese pregnant patients. *Journal of Maternal-Fetal & Neonatal Medicine*. 2009; 22: 218-26.

63 Bhattacharya S, Campbell DM, Liston WA, Bhattacharya S. Effect of Body Mass Index on pregnancy outcomes in nulliparous women delivering singleton babies. *BMC Public Health*. 2007; 7: 168.

64 Sebastián Manzanares G, Ángel Santalla H, Irene Vico Z, López Criado MS, Alicia Pineda L, José Luis Gallo V. Abnormal maternal body mass index and obstetric and neonatal outcome. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2012; 25: 308-12.

65 Olesen AW, Westergaard JG, Olsen J. Prenatal risk indicators of a prolonged pregnancy. The Danish Birth Cohort 1998-2001. *Acta Obstetricia et Gynecologica Scandinavica*. 2006; 85: 1338-41.

66 Yazdani S, Yosofniyapasha Y, Nasab BH, Mojaveri MH, Bouzari Z. Effect of maternal body mass index on pregnancy outcome and newborn weight. *BMC Research Notes*. 2012; 5: 1-4.

67 Kitiyodom S, Tongswatwong P. Pregnancy Outcomes of Parturients with Excessive-weight in Maharat Nakorn Ratchasima Hospital. *Thai Journal of Obstetrics and Gynaecology*. 2008; 16 214-20.

68 Knight M, Kurinczuk JJ, Spark P, Brocklehurst P, System UKOS. Extreme obesity in pregnancy in the United Kingdom. *Obstetrics & Gynecology*. 2010; 115: 989-97.

69 Navid S, Arshad S, Atif K, Arshad Meo R. Impact of high maternal body mass index on length of gestation and maternal delivery outcomes. *Rawal Medical Journal*. 2013; 38: 279-82.

70 Nohr EA, Timpson NJ, Andersen CS, Smith GD, Olsen J, Sorensen TIA. Severe obesity in young women and reproductive health: The danish national birth cohort. *PLoS ONE*. 2009; 4.

71 Voigt M, Zygmunt M, Henrich W, Straube S, Carstensen M, V. B. Analysis of subgroup of pregnant women in Germany. *Geburtsh Frauenheilk 16th communication: morbid obesity: pregnancy risks, birth risks and status of the newborn*. 2008; 68: 794-800.

72 Konje JC, Imrie A, Hay DM. Pregnancy in Obese Women. *Journal of Obstetrics & Gynaecology*. 1993; 13: 413-18.

73 Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D*, et al.* Meta-analysis of observational studies in epidemiology: a proposal for reporting. Meta-analysis Of Observational Studies in Epidemiology (MOOSE) group. *Jama*. 2000; 283: 2008-12.

74 Gorber SC TM, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obesity Reviews*. 2007; 8: 307-26.

75 Bodnar LM, Siega-Riz AM, Simhan HN, Diesel JC, Abrams B. The Impact of Exposure Misclassification on Associations Between Prepregnancy BMI and Adverse Pregnancy Outcomes. *Obesity*. 2010; 18: 2184-90.

Figures and tables

Figure 1: MEDLINE database search

Figure 2: PRISMA flowchart of searches, screening, and inclusion and exclusion of studies

Figure 3: Association between maternal BMI and post-term birth ≥42 weeks: 3a) Linear odds ratio per 5 maternal BMI units; 3b) Nonlinear dose-response analysis.

Legend: Linear and nonlinear dose-response analyses for post-term birth ≥42 weeks. A) The squares and lines through the squares represent the study-specific ORs and 95% CIs. The dimension of the square is proportional to the weight of the study in the meta-analysis. The diamond represents the summary OR.

Figure 4: Association between maternal BMI and post-term birth ≥41 weeks: 4a) Linear odds ratio per 5 maternal BMI units; 4b) Nonlinear dose-response analysis.

Legend: Linear and nonlinear dose-response analyses for post-term birth. A) The squares and lines through the squares represent the study-specific ORs and corresponding 95% CIs. The dimension of the square is proportional to the weight of the study in the meta-analysis. The diamond represents the summary OR. B) Linear model with data from all included studies; nonlinear model following sensitivity analysis and exclusion of Lumme et al[35], see fig. S5 and table S9.

Table 1: Summary of included studies

*Footnote: + Reference group for BMI. * Reference group for gestational age. Abbreviations: BMI = body mass index; CI = confidence interval; IQR = inter quartile range; OR = odds ratio; RR = relative risk*

Table 2: Odds ratios from linear and nonlinear dose-response analyses for maternal BMI and post-term birth.

Footnote: The midpoint generally corresponds to midpoints of WHO BMI categories. Class III obese was divided into two sub-classes (a and b) for the post-term ≥42 weeks analysis given that data was available. Two studies[52,72] were excluded from the nonlinear analyses as BMI was categorized in two groups only. Abbreviations: OR=odds ratio; CI = confidence interval; BMI=body mass index; ND=no data available.

Table 3: Results of the studies included in the narrative summary.

Footnote: Abbreviations: R = reference weight group, O = obese weight group; OR=odds ratio; AOR=adjusted odds ratio; CI=confidence interval

Medline (Ovid) - In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) (OVID) 1946 to May 2015

1	*Pregnancy/
2	Pregnan$.ti,ab.
3	Matern$.ti,ab.
4	Obes$.ti,ab.
5	(Body adj1 composition).ti,ab.
6	(BMI or Body mass index).ti,ab.
7	Weight.ti,ab.
8	(Post adj1 term$).mp.
9	Postterm$.mp.
10	(Post adj1 date$).mp.
11	Postdate$.mp.
12	(Prolonged adj1 pregnanc$).mp.
13	(Fetomaternal adj1 morbidity).mp.
14	Gestation.mp.
15	Postmaturity.mp.
16	(Post adj1 maturity).mp.
17	cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/ or retrospective studies/ or cohort.ti,ab. or longitudinal.ti,ab. or prospective.ti,ab. or retrospective.ti,ab.
18	Case-Control Studies/ or Control Groups/ or Matched-Pair Analysis/ or ((case* adj5 control*) or (case adj3 comparison*) or control group*).ti,ab.
19	Cross-Sectional Studies/ or cross-sectional.ti,ab. or ("prevalence study" or "incidence study" or "prevalence studies" or "incidence studies" or "transversal studies" or "transversal study").ti,ab.
20	1 or 2 or 3
21	4 or 5 or 6 or 7
22	8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16
23	17 or 18 or 19
24	20 and 21 and 22 and 23
25	limit 24 to human
26	limit 25 to female
27	*pregnancy, prolonged/
28	*Pregnancy Outcome/
29	*Pregnancy Complications/
30	*Body Mass Index/
31	exp overweight/
32	*obesity/
33	21 or 30 or 31 or 32
34	22 or 27 or 28 or 29
35	20 and 23 and 33 and 34
36	35 not 24
37	limit 36 to human
38	limit 37 to female

Note: .mp.= title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier

Figure 1: MEDLINE database search
fig. 1
459x471mm (96 x 96 DPI)

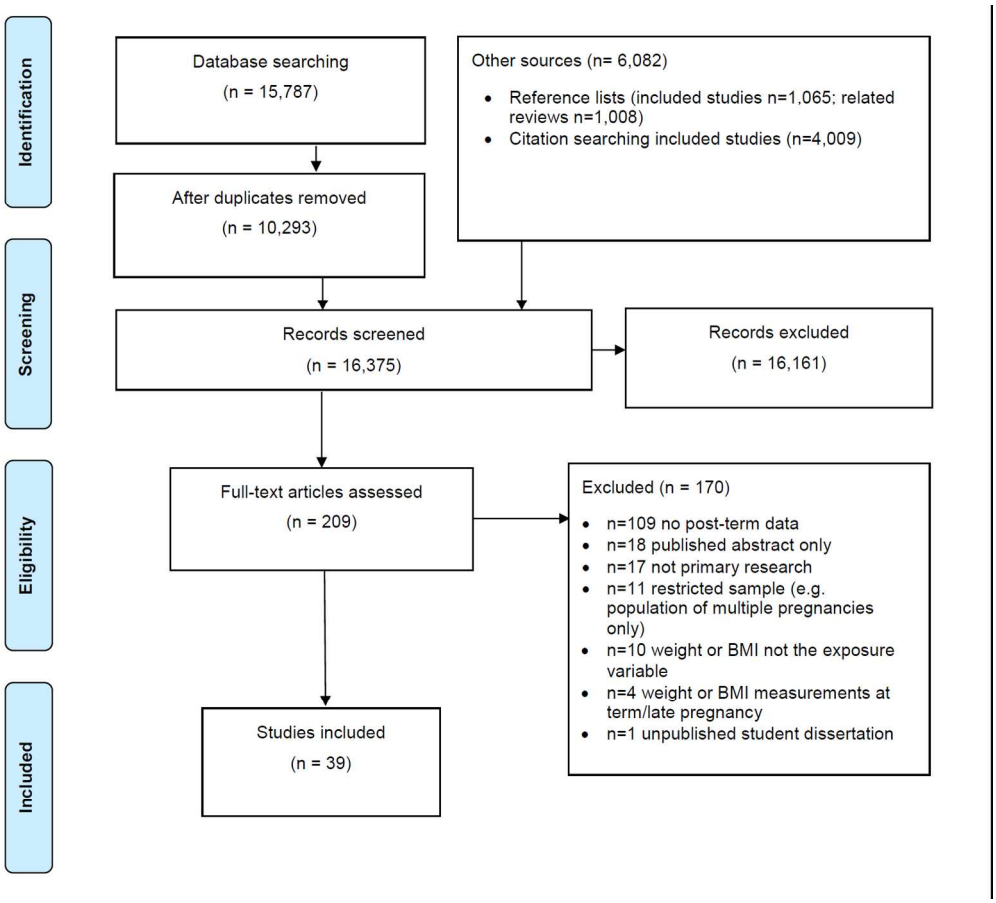


Figure 2: PRISMA flowchart of searches, screening, and inclusion and exclusion of studies
fig. 2
459x410mm (96 x 96 DPI)

Table 1: Summary of included studies

Author, publication year, region, country	Study period	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Crude analysis (OR and 95% CI unless specified)	Adjusted analysis (OR and 95% CI unless specified)	Quality score (out of 8)
Abenhaim et al 2007[41], Canada	04/1987 - 03/1997	>37-42 * >42	20-24.9 + <19.9 25-29.9 30-39.9 >40	Not reported	1(1) 1.07 (0.86-1.33) 1.13 (0.89-1.45) 0.84 (0.55-1.28) 0.76 (0.19-3.10)	3
Al-Rayyan et al 2010[42] Jordan	01/1990 - 12/2000	37-41 * >42	<30 + ≥30.0	Not reported	Not reported	2
Arora et al 2013[48] Thailand	02/2011 - 08/2012	37-41 * 42	18.5-24.9+ <18.5 25-29.9 ≥30	Not reported	Not reported	3
Arrowsmith et al 2011[58] UK	01/2004 - 12/2008	37-41^{+2} * 41^{+3}	20-24.9+ <19.9 25-29.9 30-34.9 35-39.9 >40	Not reported	1(1) 0.75 (0.66-0.85) 1.24 (1.14-1.34) 1.52 (1.37-1.70) 1.75 (1.48-2.07) 2.27 (1.78-2.86)	8
Basu et al 2010[61] South Africa	02/2006 and 09/2006	37-41 * >41	18.5-24.9+ 25-29.9 30-39.9 >40	Not reported	Not reported	3
Bhattacharya 2007[63] UK	1976-2005	37-41 * >41	20-24.9+ <19.9 25-29.9 30-34.9 >35	1 (1) 0.7 (0.6-0.8) 1.2 (1.1-1.3) 1.4 (1.1-1.6) 0.8 (0.4-1.7)	1 (1) 0.9 (0.7-1.1) 0.9 (0.8-1.1) 0.9 (0.7-1.1) 0.8 (0.4-1.8)	5
Briese et al 2011[38] Germany	1998-2000	Not reported	18.5-24.9 ≥30	Not reported	1 (1) 1.45 (1.38-1.52)	4
Caughey et al 2009[21] USA	01/1995 - 12/1999	37-<41* ≥41 37-<42* ≥42	Not obese + Obese (BMI not defined)	Not reported	1 (1) 1.29 (1.18, 1.40) 1 (1) 1.20 (0.99, 1.46)	4
Cedergren 2004[49] Sweden	01/1992 - 12/2001	37-41^{+6} * ≥42	19.8-26+ 29.1-35 35.1-40 >40	Not reported	1 (1) 1.37 (1.33-1.41) 1.49 (1.40-1.58) 1.80 (1.62-2.01)	5
Denison et al 2008[39] Sweden	1998-2002	37-41^{+6} * ≥42	20-25+ <20 25-<30 30-<35 ≥35	Term median BMI 22.9 (IQR 21.0–25.3) Postdate median BMI 23.4 (IQR 21.5–26.0) p<0.0001	Not reported	5
El-Gilany and Hammad 2010[50] Saudi Arabia	01/2007-12/2007	37-42 * >42	18.5-24.9+ <18.5 25-29.9 ≥30	RR (95% CI) 1 (1) 2.3 (0.4-12.3) 2.0 (0.6-7.1) 3.7 (1.2-11.6)	Not reported	3

Author, publication year, region, country	Study period	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Crude analysis (OR and 95% CI unless specified)	Adjusted analysis (OR and 95% CI unless specified)	Quality score (out of 8)
Halloran et al 2012[19] USA	2000-2006	37-40 * =41 =42	18.5-24.9+ <18.5 25-29.9 ≥30 18.5-24.9+ <18.5 25-29.9 ≥30	Not reported	Not reported	5
Johnson et al 1992[51] USA	01/1987-12/1989	38-42 * >42	<19.8+ 19.8-26 27-29 >29	1 (1) 1.22 (0.89-1.66) 1.58 (1.03-2.4) 1.49 (1.01-2.2)	Not reported	5
Khashan and Kenny 2009[20] UK	01/2004-12/2006	Not reported* ≥41	18.5-24.9+ <18.5 25-29.9 30-40 >40	1 (1) 0.79 (0.65-0.96) 1.13 (1.06-1.21) 1.28 (1.19-1.38) 1.17 (0.95-1.43)	1 (1) 0.81 (0.67-0.99) 1.17 (1.09-1.25) 1.35 (1.25-1.45) 1.24 (1.02-1.52)	5
Kistka et al 2007[40] USA	1989-1997	37-41+6 * ≥42	Reference not defined+ <20 >35	1 (1) 0.90 (0.88-0.93) 1.25 (1.19-1.32)	1 (1) 0.85 (0.82-0.87) 1.23 (1.16-1.29)	4
Kitiyodom and Tongswatwong 2008[67] Thailand	10/2004-09/2006	Reference not defined+ Post-term not defined	20-24.9+ >25	1 (1) 1.7 (1.19-2.44)	Not reported	3
Knight et al 2010[68] UK	09/2007-08/2008	Reference not defined+ >42	<50+ ≥50	1 (1) 1.31 (0.76-2.25)	1 (1) 1.35 (0.77-2.37)	4
Konje et al 1993[72] UK	01/1989-06/1990	37-42 * >42	17-24+ 30.4-53.0	Not reported	Not reported	4
Leung et al 2008[34] Hong Kong	01/1995-12/2005	37-40+6 * ≥41	18.5-<23+ <18.5 ≥23-<25 ≥25-<27.5 ≥27.5-<30 ≥30	Not reported	1 (1) 0.84 (0.74-0.95) 1.06 (0.97-1.17) 1.21 (1.08-1.36) 1.25 (1.05-1.48) 1.34 (1.09-1.66)	4
Lumme et al 1995[35] Finland	07/1985-06/1986	37-41 * >41	19-24.9+ <19 25-29.9 ≥30	Not reported	1 (1) 1.0 (0.7-1.4) 1.6 (1.2-2.1) 1.1 (0.6-1.9)	4
Mancuso et al 1991[36] Italy	Not reported	38-41 * >42	15.2-26.6+ >30	Not reported	Not reported	1
Manzanares et al 2012[37] Spain	2007-2009	37-41+2 * >41+3	18.5-25+ <18.5 >35	Not reported	1 (1) 0.81 (0.35-1.91) 0.72 (0.34-1.55)	4
Morgan et al 2014[43] UK	11/2010-02/2013	Reference not defined + =42	18.5-24.9+ 25-29.9 >29.9	1 (1) 2.18 (0.99-4.84)	Not reported	4
Navid et al 2013[69] Pakistan	05/2011 - 07/2012	37-40* >40	18-24.9+ 25-35	Not reported	Not reported	2

Author, publication year, region, country	Study period	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Crude analysis (OR and 95% CI unless specified)	Adjusted analysis (OR and 95% CI unless specified)	Quality score (out of 8)
Nohr et al 2009[70] Denmark	1996-2002	37-41* >41	15-33.3+ 32.6-<35 35-<37.5 ≥37.5	Not reported	1 (1) 1.3 (1.1-1.5) 1.5 (1.3-1.8) 1.4 (1.2-1.7)	4
Olesen et al 2006[65] Denmark	1996-2004	37- 41+6 * ≥42	20-24+ <20 25-29 30-34 ≥35	1 0.87 1.23 1.35 1.48 95%CI not reported	1 (1) 0.87 (0.80-0.94) 1.24 (1.15-1.34) 1.37 (1.22-1.54) 1.52 (1.28-1.82)	3
Raatikainen et al 2006[53] Finland	01/1989 - 12/2001	Reference not defined + >42	≤25+ 26-29 ≥30	Not reported	Not reported	5
Robinson et al 2005[37] Canada	01/1988 - 12/1992	Reference not defined + >41	55-75Kg+ ≥90-120Kg >120Kg	1 (1) 1.10 (1.01-1.20) 0.91 (0.67-1.23)	1 (1) 1.18 (1.08-1.28) 0.99 (0.74-1.34)	4
Rode et al 2005[54] Denmark	1998 - 2001	37-42* >42	<25+ 25-29.9 ≥30	Not reported	1 (1) 1.4 (1.2-1.7) 1.4 (1.1-1.9)	5
Roos et al 2010[55] Sweden	01/1992 - 12/2006	37-41+6* ≥42	20-24.9+ <20 25-29.9 ≥30	Not reported	1 (1) 0.74 (0.72-0.76) 1.31 (1.29-1.33) 1.63 (1.59-1.67)	8
Schrauwers and Dekker 2009[62] Australia	01/2006 - 06/2006	37-41* >41	19.1-25+ 25.1-30 30.1-40 >40	Not reported	Not reported	2
Scott-Pillai et al 2013[59] UK	2004-2011	Reference not defined + >41	18.5-24.99+ <18.50 25-29.99 30-34.99 35-39.99 ≥40	Not reported	1 (1) 0.5 (0.2-1.0) 0.9 (0.7-1.1) 0.8 (0.5-1.1) 0.9 (0.5-1.6) 0.8 (0.4-1.7)	7
Sharief and Tarik 2000[36] Iraq	12/1997-08/1998	Reference not defined + Post-term not defined	<=90Kg >90Kg	Not reported	Not reported	3
Stotland et al 2007[56] USA	1990-2001	37-<41* ≥41 37-<42* ≥42	19.8-26+ <19.8 26.1-29 >29	Not reported	1 (1) 0.83 (0.72-0.95) 1.29 (1.10-1.52) 1.81 (1.50-2.18) 1 (1) 0.78 (0.60-1.01) 1.51 (1.15-1.97) 1.69 (1.23-2.31)	6
Usha Kiran et al 2005[44] UK	1990-1999	37-41* >41	20-30+ >30	1 (1) 1.4 (1.2-1.7)	Not reported	4
Vaswani and Balachandran 2013[60] United Arab Emirates	12/2010 - 10/2011	37-41* >41	18.5-24.9+ 25-29.9 30-34.9 35-39.9 ≥40	Not reported	1 (1) 1.54 (0.89-2.65) 1.69 (0.96-2.98) 1.78 (0.93-3.42) 2.99 (1.35-6.65)	4

Author, publication year, region, country	Study period	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Crude analysis (OR and 95% CI unless specified)	Adjusted analysis (OR and 95% CI unless specified)	Quality score (out of 8)
Vinturache et al 2014[57] Canada	05/2008 - 12/2010	37-41[+6] * ≥42	18.5-24.99[+] 25-29.99 ≥30	Not reported	Not reported	5
Voigt et al 2008[71] Germany	1998-2000	Term, not defined [+] Post-term, not defined	18.5-24.99[+] 40-44.99 ≥45	Not reported	Not reported	2
Yazdani et al 2006[66] Iran	2008-2009	Term, not defined [+] Post-term, not defined	20-24.9[+] ≤19.9 25-29.9 30-34.9 >35	Not reported	Not reported	2

Footnote: [+] Reference group for BMI. * Reference group for gestational age. Abbreviations: BMI = body mass index; CI = confidence interval; IQR = inter quartile range; OR = odds ratio; RR = relative risk

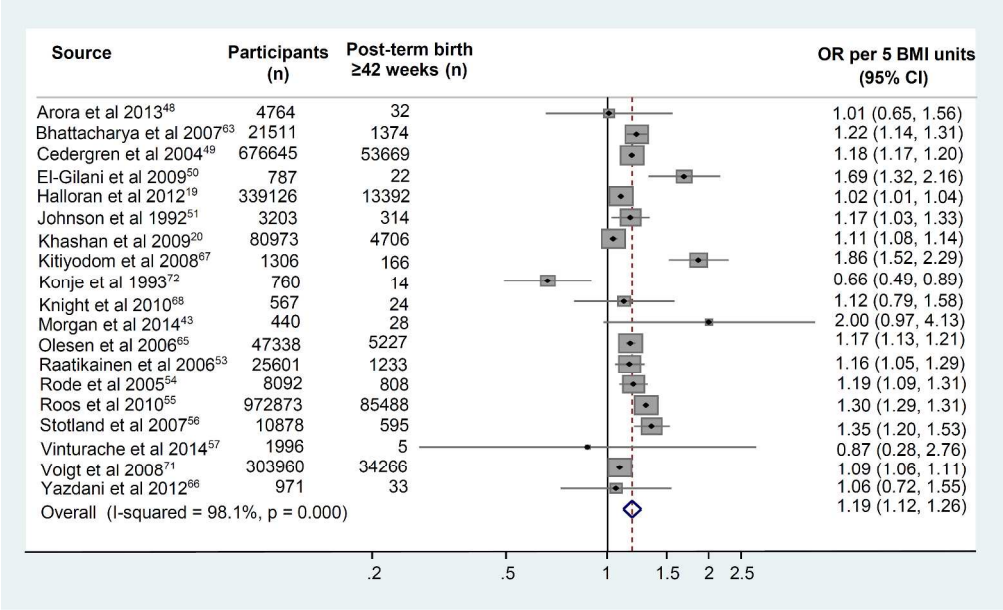


Figure 3: Association between maternal BMI and post-term birth ≥42 weeks: 3a) Linear odds ratio per 5 maternal BMI units

Legend: Linear dose-response analyses for post-term birth ≥42 weeks. A) The squares and lines through the squares represent the study-specific ORs and 95% CIs. The dimension of the square is proportional to the weight of the study in the meta-analysis. The diamond represents the summary OR.

fig. 3a

1098x714mm (96 x 96 DPI)

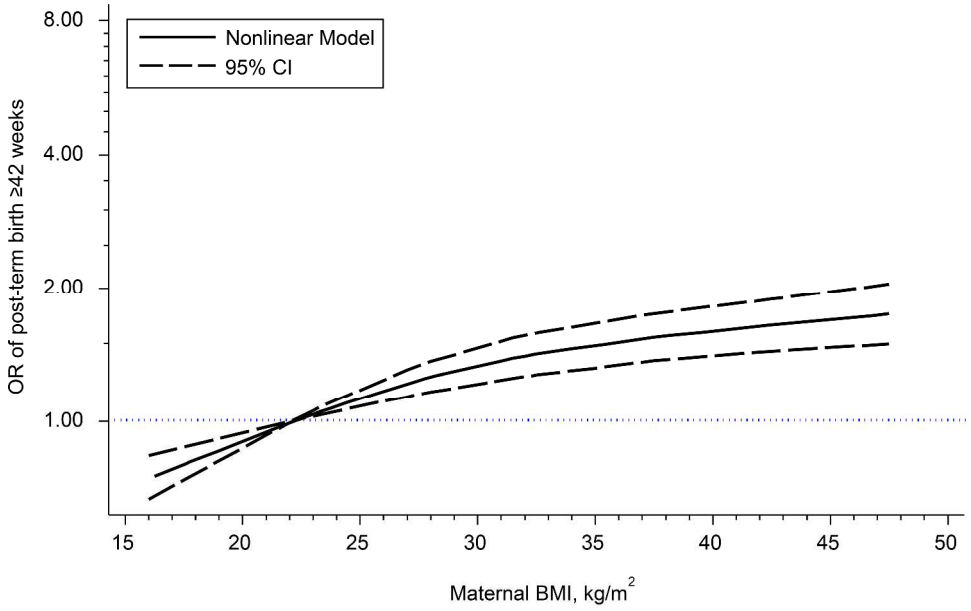


Figure 3: Association between maternal BMI and post-term birth ≥42 weeks: 3b) Nonlinear dose-response analysis.
Legend: Nonlinear dose-response analyses for post-term birth ≥42 weeks.
fig. 3b
1893x1192mm (96 x 96 DPI)

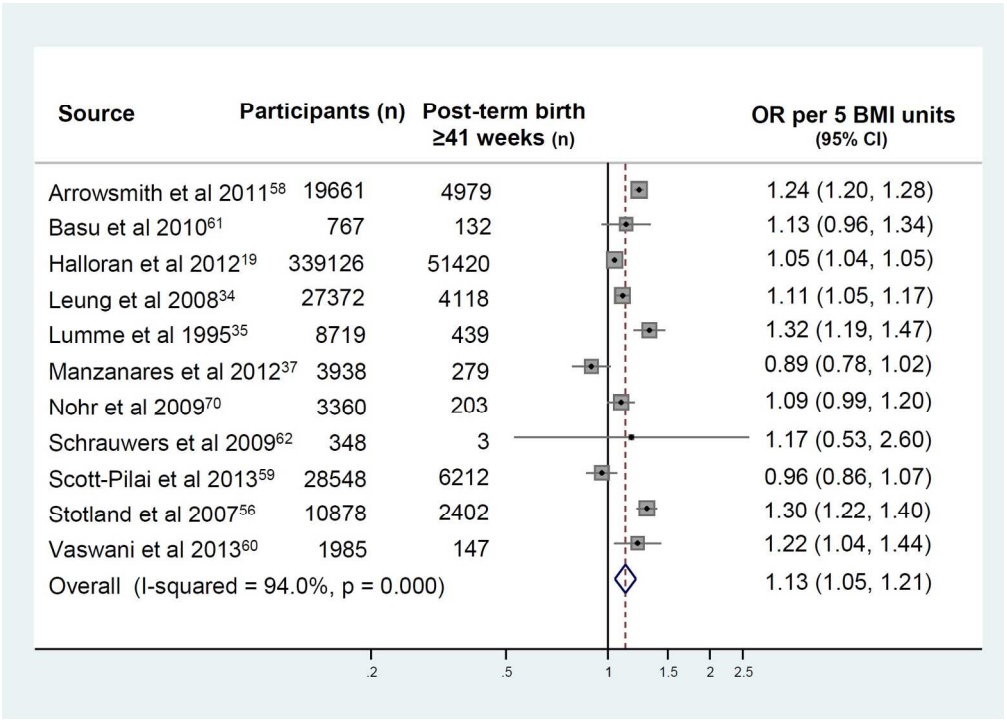


Figure 4: Association between maternal BMI and post-term birth ≥41 weeks: 4a) Linear odds ratio per 5 maternal BMI units.

Legend: Linear dose-response analyses for post-term birth. A) The squares and lines through the squares represent the study-specific ORs and corresponding 95% CIs. The dimension of the square is proportional to the weight of the study in the meta-analysis. The diamond represents the summary OR.

fig. 4a

530x378mm (96 x 96 DPI)

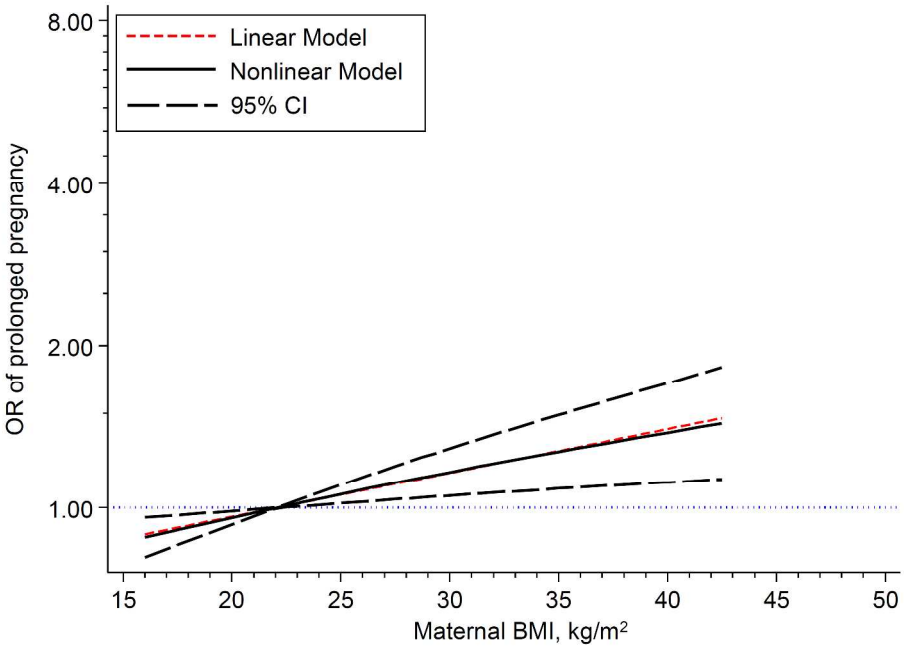


Figure 4: Association between maternal BMI and post-term birth ≥41 weeks: 4b) Nonlinear dose-response analysis.
Legend: Nonlinear dose-response analyses for post-term birth. B) Linear model with data from all included studies; nonlinear model following sensitivity analysis and exclusion of Lumme et al[35], see fig. S5 and table S9.
fig. 4b
1018x714mm (96 x 96 DPI)

Table 2: Odds ratios from linear and nonlinear dose-response analyses for maternal BMI and post-term birth

		BMI Class (Midpoint BMI, kg/m^2)						
	Model	Underweight (17.5)	Reference BMI (22.5)	Overweight (27.5)	Obese I (32.5)	Obese II (37.5)	Obese IIIa (42.5)	Obese IIIb (47.5)
Post-term ≥42 weeks	Linear OR (95% CI)	0.84 (0.76,0.94)	1	1.19 (1.12,1.27)	1.38 (1.31,1.46)	1.57 (1.50,1.64)	1.76 (1.69,1.83)	1.95 (1.88,2.02)
	Nonlinear OR (95% CI)	0.81 (0.74,0.88)	1	1.24 (1.15,1.34)	1.42 (1.27,1.58)	1.55 (1.37,1.75)	1.65 (1.44,1.87)	1.75 (1.50,2.04)
Post-term ≥41 weeks	Linear OR (95% CI)	0.88 (0.83,0.95)	1	1.13 (1.05,1.21)	1.26 (1.18,1.34)	1.39 (1.31,1.47)	1.52 (1.44,1.54)	ND
	Nonlinear OR (95% CI)	0.91 (0.85,0.97)	1	1.11 (1.04,1.20)	1.22 (1.07,1.39)	1.33 (1.10,1.59)	1.44 (1.13,1.83)	ND

Footnote: The midpoint generally corresponds to midpoints of WHO BMI categories. Class III obese was divided into two sub-classes (*a* and *b*) for the post-term ≥42 weeks analysis given that data was available. Two studies[52,72] were excluded from the nonlinear analyses as BMI was categorized in two groups only. Abbreviations: OR=odds ratio; CI = confidence interval; BMI=body mass index; ND=no data available.

Table 3: Results of the studies included in the narrative summary

Study	Country of study	Sample size	Maternal weight exposure variable*	Post-term variable	Results	Association with obesity	Primary reason not included in meta-analysis
Abenhaim et al 2007[41]	Canada	18,633	R: BMI 20 to 24.9 O1: BMI 30 to 39.9 O2: BMI >40	>42 weeks	O1: AOR 0.84 (95% CI 0.55-1.28) O2: AOR 0.76 (95% CI 0.19-3.10) Frequency data not provided	No significant difference	No frequency data provided
Al-Rayyan et al 2010[42]	Jordan	1,008	R: BMI <30 O: BMI >30	>42 weeks	R: n=55, 10.6% O: n=54, 11.0% Statistical analysis not reported	No difference	Non-comparable BMI reference group
Briese et al 2011[38]	Germany	243,571	R: BMI 18.5 to 24.9 O: BMI ≥30	Not defined	AOR 1.45 (95% CI 1.38-1.52) Frequency data not provided	Significantly increased	No frequency data provided
Caughey et al 2009[21]	USA	119,162	R: 'Not obese' O: 'Obese' Not defined	≥41 weeks ≥42 weeks	≥41 weeks AOR 1.26 (95% CI 1.16-1.37) ≥42 weeks AOR 1.20 (95% CI 0.99-1.46) Frequency data not provided	Significantly increased (41 weeks only)	No frequency data provided; Non-comparable BMI reference group
Denison et al 2008[39]	Sweden	143,519	R: BMI 20 to <25 O1: BMI 30 to <35 O2: BMI ≥35	≥294 days (42 weeks)	Higher maternal BMI in 1st trimester increased post-term (p<0.001)	Significantly increased	No frequency data provided
Kistka et al 2007[40]	USA	368,633	R: not defined O:BMI >35	≥42 weeks	AOR 1.23 (95% CI 1.16-1.29) Frequency data not provided	Significantly increased	No frequency data provided
Mancuso et al 1991[36]	Italy	160	R: BMI 15.2-26.6 O: BMI >30	>42 weeks	R: n=1 O: n=3 p >0.05	No significant difference	Non-comparable BMI reference group
Robinson et al 2005[37]	Canada	142,404	R: 55 to 75kg O1: 90 to 120kg O2: >120kg	>41 weeks	R: n=4997, 6.3% O1: n=647, 6.9%; AOR 1.18 (95% CI 1.08-1.28) O2: n=45, 5.8%; AOR 0.99 (95% CI 0.74-1.34)	Significantly increased (O1 only)	Maternal exposure weight
Sharief et al 2000[36]	Iraq	40	R: ≤90kg O: >90kg	Not defined	R: n=3, 15% O: n=3, 15% Statistical analysis not reported	No difference	Maternal exposure weight
Usha Kiran et al 2005[44]	Wales	8,350	R: BMI 20 to 30 O: BMI >30	>41 weeks	R: n=2490, 32.5% O: n=278, 41.0%; OR 1.4 (95% CI 1.2-1.7)	Significantly increased	Non-comparable BMI reference group

Footnote: Abbreviations: R = reference weight group, O = obese weight group; OR=odds ratio; AOR=adjusted odds ratio; CI=confidence interval

List of Supporting Information

Figure S1: Translation of search terms across databases

Embase (OVID) 1974 to 2015 Week 21

1. *Pregnancy/
2. Pregnan$. ti,ab.
3. Matern$. ti,ab.
4. Obes$. ti,ab.
5. (Body adj1 composition). ti,ab.
6. (BMI or Body mass index).ti,ab.
7. Weight.ti,ab.
8. (Post adj1 term$).mp.
9. Postterm$.mp.
10. (Post adj1 date$).mp.
11. Postdate$.mp.
12. (Prolonged adj1 pregnanc$).mp.
13. (Fetomaternal adj1 morbidity).mp.
14. Gestation.mp.
15. Postmaturity.mp.
16. (Post adj1 maturity).mp.
17. Cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/ or retrospective studies/ or cohort.ti,ab. or longitudinal.ti,ab. or prospective.ti,ab. or retrospective.ti,ab.
18. Case-Control Studies/ or Control Groups/ or Matched-Pair Analysis/ or ((case* adj5 control*) or (case adj3 comparison*) or control group*).ti,ab.
19. Cross-Sectional Studies/ or cross-sectional.ti,ab. or ("prevalence study" or "incidence study" or "prevalence studies" or "incidence studies" or "transversal studies" or "transversal study").ti,ab.
20. 1 or 2 or 3
21. 4 or 5 or 6 or 7
22. 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16
23. 17 or 18 or 19
24. 20 and 21 and 22 and 23
25. Limit 24 to human
26. Limit 25 to female
27. *Body Mass Index/
28. exp Overweight/
29. *Obesity/ or *Obesity, Morbid/
30. 21 or 27 or 28 or 29
31. *prolonged pregnancy/
32. *pregnancy outcome/
33. *pregnancy complication/
34. 22 or 31 or 32 or 33
35. 20 and 23 and 30 and 34
36. 35 not 24
37. Limit 36 to human
38. Limit 37 to female

Note: .mp.=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword

PsycINFO (OVID) 1806 to May Week 3 2015

1. *Pregnancy/
2. Pregnan$. ti,ab.
3. Matern$. ti,ab.
4. Obes$. ti,ab.
5. (Body adj1 composition). ti,ab.
6. (BMI or Body mass index).ti,ab.
7. Weight.ti,ab.
8. (Post adj1 term$).mp.
9. Postterm$.mp.
10. (Post adj1 date$).mp.
11. Postdate$.mp.
12. (Prolonged adj1 pregnanc$).mp.
13. (Fetomaternal adj1 morbidity).mp.

14. Gestation.mp.
15. Postmaturity.mp.
16. (Post adj1 maturity).mp.
17. Cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/ or retrospective studies/ or cohort.ti,ab. or longitudinal.ti,ab. or prospective.ti,ab. or retrospective.ti,ab.
18. Case-Control Studies/ or Control Groups/ or Matched-Pair Analysis/ or ((case* adj5 control*) or (case adj3 comparison*) or control group*).ti,ab.
19. Cross-Sectional Studies/ or cross-sectional.ti,ab. or ("prevalence study" or "incidence study" or "prevalence studies" or "incidence studies" or "transversal studies" or "transversal study").ti,ab.
20. 1 or 2 or 3
21. 4 or 5 or 6 or 7
22. 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16
23. 17 or 18 or 19
24. 20 and 21 and 22 and 23
25. Limit 24 to human
26. Limit 25 to female
27. *Body Mass Index/
28. Exp Overweight/
29. *Obesity/ or *Obesity, Morbid/
30. 21 or 27 or 28 or 29
31. *obstetrical complications/
32. *pregnancy outcomes/
33. 22 or 31 or 32
34. 20 and 23 and 30 and 33
35. 34 not 24
36. Limit 36 to human
37. Limit 37 to female

Note:.mp.=title, abstract, heading word, table of contents, key concepts, original title, tests and measures

CINAHL (EBSCO) 1981-May 2015

1 MM pregnancy OR TI pregnan* OR TI matern* OR AB pregnan* OR AB matern*
2 MM body mass index OR MM obesity OR MH overweight+ OR TI obes* OR AB obes* OR TI body w1 composition OR AB body w1 composition OR TI bmi OR AB bmi OR TI body mass index OR AB body mass index
3 TI weight OR AB weight
4 2 OR 3
5 TX (post term* or postterm*) OR TX ((post w1 date*) or postdate*) OR TX prolonged w1 pregnanc* OR TX fetomaternal w1 morbidity OR TX gestation OR TX postmaturity OR TX post w1 maturity OR MM “infant, postmature” OR MM “pregnancy outcomes” OR MM “pregnancy complications”
6 (MH “prospective studies”) OR (MH “case control studies+”) OR (MH “correlational studies”) OR (MH “nonconcurrent prospective studies”) OR (MH “cross sectional studies”)
7 TX (cohort w1 (study or studies))
8 TX (observational w1 (study or studies))
9 6 OR 7 OR 8
10 1 AND 4 AND 5 AND 9

British Nursing Index (NHS HDAS) 1992-May 2015

1. (pregnan* OR matern*).ti,ab.
2. PREGNANCY/
3. 1 or 2
4. (obes* OR (body adj1 composition) OR bmi OR (body mass index) OR weight).ti,ab.
5. OBESITY/
6. 4 OR 5
7. (postterm* OR (post adj1 term) OR postdate* OR (post adj1 date*) OR (prolonged adj1 pregnan*) OR (fetomaternal adj1 morbidity) OR gestation OR postmaturity OR (post adj maturity)).af
8. PREGNANCY : COMPLICATIONS/
9. 7 OR 8
10. 3 AND 6 AND 9

Table S1: Data extraction protocol

Reviewer	
Title	
Author and Year	
Setting	Location (region/city, country): Study name or dataset:
Data collection time period	
Endpoint and definition Author definition of gestation at delivery	Reference group: …… weeks gestation Postdate birth 1: …… weeks gestation Postdate birth 2: …… weeks gestation Postdate birth 3: …… weeks gestation
Exposure definition	BMI used to define groups? Yes / No Reference group defined as: ……Kg/m^2 BMI group(s) defined as: Underweight: …… Kg/m^2 Overweight: …… Kg/m^2 Obese group 1: …… Kg/m^2 Obese group 2: …… Kg/m^2 Obese group 3: …… Kg/m^2 Obese group 4: …… Kg/m^2

Methodology: ☐ Prospective Cohort ☐ Retrospective Cohort ☐ Case Control

	Total group	Reference group	Under weight	Over weight	Obese group 1	Obese group 2	Obese group 3	Obese group 4
Number Identified								
Number Excluded								
Final Number Included								
All Subjects Accounted for?	Yes No Unclear	Yes No Unclear	Yes No Unclear	Yes No Unclear	Yes No Unclear	Yes No Unclear	Yes No Unclear	Yes No Unclear

Inclusion criteria (e.g. gestation at weight measurement, singleton etc)	
Exclusion criteria	

Group Determination – measure of maternal BMI	☐ Measured	☐ Self Report	☐ Unclear
	☐ Medical Records	☐ Prospectively collected for the study	☐ Unclear
Ascertainment of Outcome – gestation at delivery	☐ Measured	☐ Self Report	☐ Unclear
	☐ Medical Records	☐ Prospectively collected for the study	☐ Unclear

Baseline Characteristics reported? Yes / No **(if no do not complete, if yes populate with the data)**

Characteristic (include definition and unit of measurement)	Total group	Reference group	Under weight	Over weight	Obese group 1	Obese group 2	Obese group 3	Obese group 4	P value
Maternal Age									
Gestational Age at Booking									
Ethnicity									

Baseline BMI									
Smoking Status									
Illicit Drug Use									
Alcohol Intake									
Socio-Economic Status									
Parity									
Singleton Gestation									
Description of any differences between BMI groups:									

Data Analysis:

	Number				**Crude RR / OR** (delete as applicable)	**…..% CI**	**P value**	**Adjusted RR / OR** (delete as applicable)	**…..% CI**	**P value**	**Factors adjusted for in analyses:**
Outcome:		**yes**	**no**	**Total**							
Postdate pregnancy	Reference group										
……wks	Under weight										
	Over weight										
	Obese										**Data Analysis methods:**
	Obese group 2										
	Obese group 3										
	Obese group 4										

Figure S2: Adapted Newcastle-Ottatwa Scale [1] for Cohort Studies[#]

Selection

1) Representativeness of the exposed cohort (exposure in this context is maternal BMI risk group, e.g. obesity)
   a) truly representative of the average pregnant population in the community *
   b) somewhat representative of the average pregnant population in the community *
   c) selected group of users (eg only first time pregnancy, only teenage pregnancy etc)
   d) no description of the derivation of the cohort

2) Selection of the non exposed cohort (non-exposure is the maternal BMI group used as reference e.g. recommended BMI)
   a) drawn from the same community as the exposed cohort*
   b) drawn from a different source (E.g. different maternity unit, different specialist clinic, different time range for recruitment between BMI groups)
   c) no description of the derivation of the non exposed cohort

3) Ascertainment of exposure (maternal weight status)
   a) secure record * (Measured weight used)
   b) validated self-report * (self-report with measured weight validation)
   c) self report
   d) no description

~~4) Demonstration that outcome of interest was not present at start of study~~ [##]
   ~~a) yes *~~
   ~~b) no~~

Comparability

4) Comparability of cohorts on the basis of the design or analysis
   a) study controls for induction of labour or caesarean * (either excluded or adjusted)
   b) study controls for any additional factor *
   c) no factors controlled for

Outcome

5) Assessment of outcome (outcome is gestational age at delivery)
   a) independent blind assessment/measured * (e.g. measurement (ultrasound scan) carried out prospectively for research purposes)
   b) record linkage/measured * (e.g. retrospective routine hospital records of ultrasound scan to confirm gestational age)
   c) self report (e.g. last menstrual period)
   d) no description

6) Was follow-up long enough for outcomes to occur (until spontaneous onset of labour before post-term definition)
   a) yes *
   b) no

7) Adequacy of follow up of cohorts
   a) complete follow up - all subjects accounted for *
   b) subjects lost to follow up unlikely to introduce bias - small number lost to follow up >80 % (select an adequate %), or description provided of those lost *
   c) follow up rate < 80% and no description of those lost
   d) no statement

Total number of stars (out of a possible 8[###]):

Notes:

There were no true case control studies included in the systematic review where the case and control status was defined based on the case definition of the outcome variable (i.e. gestational age at delivery). Those studies which had been described by authors as case control, or that followed a case control method of selecting “cases” and “controls” (n=4) used the exposure status (BMI) to allocate case or control status. Therefore these studies used the pre/early pregnancy baseline exposure status to define the groups and followed the women for the duration of their pregnancy until birth to ascertain delivery outcomes (either prospectively or retrospectively). These study designs better fit the cohort design Quality Assessment Scale and therefore this has been used for all included studies.

Question 4 “Demonstration that outcome of interest was not present at start of study” is not applicable to gestational age at delivery outcomes as women are identified in early pregnancy using their pre/early pregnancy BMI and their pregnancy outcomes are not known at the start of the study. Therefore this item has been removed from the scale

The denominator value for the maximum number of stars a study can be awarded has been reduced from 9 to 8 due to the removal of the original question 4.

Table S2: Screening: systematic review reference lists screened, and full papers screened and excluded

Table S2a: Reference lists of systematic reviews screened

Review	Number of references screened
Bogaerts et al 2013 [2]	70
Castro and Avina 2002 [3]	31
Catalano and Ehrenberg 2006 [4]	55
Caughey et al 2008 [5]	99
Gülmezoglu et al 2012 [6]	137
Heslehurst et al 2008 [7]	85
Linne 2004 [8]	93
Lutsiv et al 2015 [9]	94
McDonald et al 2010 [10]	102
Nuthulapaty and Rouse 2004 [11]	97
Torloni et al 2009 [12]	77
Vasudevan et al 2011 [13]	50
Walker and Gan 2015 [14]	8
Wolfe 1998 [15]	10

Table S2b: Full details of studies excluded following full paper review

References of studies screened in full and excluded	
Exclusion Reason	**Reference Number**
Abstract/poster only	1-18
Abstract authors contacted *Unable to contact*	*1-5, 8-18* *6-7*
BMI at term/late pregnancy	19-22
BMI not an exposure	23-32
Multiple gestations only	33
Not post term	34-142
Not primary research	143-159
Restricted subsample of maternity population	160-169
Unpublished student dissertation	170

Reference list of excluded studies

1. Cidade, D. G., P. R. Margotto, A. C. B. S. Guedes, A. A. Rocha, F. R. Assis, F. F. Cardoso, R. C. R. Lemes, V. T. M. Borges and J. C. Peracoli (2012). "High prevalence of pre-pregnancy overweight and obesity associated with maternal and perinatal complications." Pregnancy Hypertension 2 (3): 323.
2. Darsareh, F. and S. Nourbakhsh (2012). "Pre-pregnancy body mass index and the risk of prolonged pregnancy." International Journal of Gynecology and Obstetrics 119: S756.
3. Guariglia, L., P. Ciliberti, S. Buongiorno, A. Alessio, E. Nobili, M. Tintoni, P. Rosati and G. Capelli (2013). "Risk factors in prolonged pregnancy." Journal of Perinatal Medicine 41.
4. Hallaron, D. R., N. Marshall, Y. W. Cheng and A. B. Caughey (2012). "Effect of obesity on induction across gestational age." American Journal of Obstetrics and Gynecology 1): S250.
5. Idris, N. and K. N. C. Nyan (2012). "The association of maternal obesity and gestational weight gain with obstetric and neonatal outcomes among parturients in Seremban, Malaysia." BJOG: An International Journal of Obstetrics and Gynaecology 119: 75.
6. Kapoor, D. and S. Rajendran (2013). "Can we improve care and outcomes of pregnancy in women with morbid obesity?" BJOG: An International Journal of Obstetrics and Gynaecology 120: 30-31.
7. Kapoor, D., J. Davison and S. Rajendran (2013). "Audit on care and outcome of pregnancy in women with morbid obesity." Archives of Disease in Childhood: Fetal and Neonatal Edition 98.
8. Lam, S., L. Kindinger and L. Phelan (2012). "Weight gain in pregnancy." Archives of Disease in Childhood: Fetal and Neonatal Edition 97: A114.
9. Marshall, N. E., C. Guild, Y. W. Cheng, A. B. Caughey and D. R. Halloran (2012). "Impact of maternal BMI on induction of labor." American Journal of Obstetrics and Gynecology 1): S147.
10. Marshall, N. E., J. M. Snowden, P. F. O'Tierney-Ginn, K. Melsap, J. Chung, E. Main, W. Gilbert and A. B. Caughey (2013). "Influence of fetal sex, maternal obesity, and gestational weight gain on perinatal outcomes." Reproductive Sciences 1): 309A-310A.
11. Martin, K., R. M. Grivell, L. N. Yelland and J. M. Dodd (2013). "Gestational diabetes mellitus among women who are overweight and obese: The effect of BMI category." Obesity Research and Clinical Practice 7: 11.

References of studies screened in full and excluded

12. Nohr, E. A. (2012). "Obesity in pregnancy. Outcomes in the mother and child." Obesity Facts 5: 20.
13. O'Dwyer, V., J. Hogan, N. Farah, M. M. Kennelly, B. Stuart and M. J. Turner (2012). "Changes in maternal body composition during pregnancy." Archives of Disease in Childhood: Fetal and Neonatal Edition 97: A47.
14. Oniya, O., K. Hanretty, J. Gibson and K. Guerrero (2010). "Audit of pregnancy outcomes and co-morbidities in the obese population." Obesity Reviews 11 (11): 830.
15. Redfearn, C. F., S. Wandiembe and E. Oteng-Ntim (2012). "Quantification of healthcare costs of obesity in pregnancy: A retrospective observational cohort study." Archives of Disease in Childhood: Fetal and Neonatal Edition 97: A110.
16. Schuster, M. Neubert, A. Kirchner, L Paglia, M. The impact of body mass index on pregnancy complications. 2015. American Journal of Obstetrics and Gynaecology. 1): S421.
17. Suresh, A., A. Liu, A. Poulton, A. Quinton, Z. Amer, M. Mongelli, A. Martin, R. Benzie, M. Peek and R. Nanan (2012). "Comparison of maternal abdominal subcutaneous fat thickness and body mass index as markers for pregnancy outcomes: A stratified cohort study." Australian and New Zealand Journal of Obstetrics and Gynaecology 52(5): 420-426.
18. Trombe, K. S. D., H. Bettiol, R. C. Cavalli, M. R. P. Gutierrez, M. A. Barbieri, C. Grandi and V. C. Cardoso (2014). "Association between maternal pre-pregnancy body mass index and size at birth in Ribeirao Preto, Sao Paulo, Brazil." Archives of Disease in Childhood 99: A240.
19. Fatima, S. A. Rehman, S. A. Gangat, A. Kamal, Z. Ahmad (2011). “To compare maternal and fetal outcome in obese verses non-obese labouring mothers.” Journal University Medical and Dental College 2(2): Jul-Dec 2011.
20. Mamula, O., N. S. Severinski, M. Mamula and S. Severinski (2009). "Complications during pregnancy, labor and puerperium in women with increased BMI at pregnancy term." Central European Journal of Medicine 4(1): 71-75.
21. Metzger, B. E. (2010). "Hyperglycaemia and adverse pregnancy outcome (HAPO) study: Associations with maternal body mass index." BJOG: An International Journal of Obstetrics and Gynaecology 117(5): 575-584.
22. Pongthai, S. (1990). "Labour and delivery of obese parturients." Journal of the Medical Association of Thailand 73 Suppl 1: 52-56.
23. Campbell MK, Ostbye T, Irgens LM. Postterm birth: risk factors and outcomes in a 10-year cohort of Norwegian births. Obstet Gynecol1997;89:543-8.
24. Caughey and Bishop, Maternal complications of pregnancy increase beyond 40 weeks of gestation in low-risk women. J Perinatol 2006:26:540-545
25. Caughey et al Maternal and obstetric complications of pregnancy are associated with increasing gestational age at term. Am j obstet gynecol 2007 196(2)155 e1-6
26. Collins, J. W., N. F. Schulte, L. George and A. Drolet (2000). "Postterm delivery among African Americans, Mexican Americans and Whites in Chicago." Ethnicity & disease 11(2): 181-187.
27. Fleten, C., H. Stigum, P. Magnus and W. Nystad (2010). "Exercise during pregnancy, maternal prepregnancy body mass index, and birth weight." Obstetrics & Gynecology 115(2, Part 1): 331-337.
28. Greve et al Maternal and perinatal complications by day of gestation after spontaneous labor at 40-42 weeks of gestation. Acta obstetricia Gynecol Scand 2011 Aug; 90: 852-6
29. Jukic et al. (2013) “Length of Human Pregnancy and contributors to its natural variation” Human Reproduction 2013 Oct;28(10):2848-2855.
30. Olesen, A. W., J. G. Westergaard and J. Olsen (2003). "Perinatal and maternal complications related to postterm delivery: a national register-based study, 1978-1993." American journal of obstetrics and gynecology 189(1): 222-227.
31. Shea, K. M., A. J. Wilcox and R. E. Little (1998). "Postterm delivery: a challenge for epidemiologic research." Epidemiology 9(2): 199-204.
32. Zareen, N., S. Naqvi, N. Majid and H. Fatima (2009). "Perinatal outcome in high risk pregnancies." Journal of the College of Physicians and Surgeons Pakistan 19(7): 432-435.
33. Moore, E. and J. Sumners (2012). "Impact of maternal pre-pregnancy body mass index on pregnancy and infant outcomes in triplet gestations." American Journal of Obstetrics and Gynecology 1): S67.
34. Abu Yaacob S, Saad FA, Sharara HA, Khalifa L, Manther AA, Rashed YA. The effect of obesity in pregnancy on perinatal outcome in Qatar. Qatar Medical Journal 2002;11:32-5
35. Alanis, M.C., Goodnight, W.H., Hill, E.G., Robinson, C.J., Villers, M.S. and Johnson, D.D. (2010) Maternal super-obesity (body mass index > or =50) and adverse pregnancy outcomes. Acta Obstetricia et Gynecologica Scandinavica, 89, 924-930.
36. Andreasen, K. R., M. L. Andersen and A. L. Schantz (2004). "Obesity and pregnancy." Acta obstetricia et gynecologica Scandinavica 83(11): 1022-1029.
37. Athukorala, C., Rumbold, A.R., Willson, K.J. and Crow- ther, C.A. (2010) The risk of adverse pregnancy out- comes in women who are overweight or obese. BMC Pregnancy Childbirth, 10, 56.

References of studies screened in full and excluded

38. Baeten, J. M., E. A. Bukusi and M. Lambe (2001). "Pregnancy complications and outcomes among overweight and obese nulliparous women." American Journal of Public Health 91(3): 436.
39. Barau G, Robillard PY, Hulsey TC, Dedecker F, Laffite A, Gérardin P, et al. Linear association between maternal pre-pregnancy body mass index and risk of caesarean section in term deliveries. Br J Obstet Gynaecol 2006;113:1173-7.
40. Baron CM, Girling LG, Mathieson AL, Menticoglou SM, Seshia MM, Cheang MS, Mutch WA: Obstetrical and neonatal outcomes in obese parturients. J Matern Fetal Neonatal Med 2010, 23(8):906–913.
41. Beyer et al., 2011. Obesity decreases the chance to deliver spontaneously Archives of Gynecology and Obstetrics, 283 (2011), pp. 981–988
42. Bianco, A. T., S. W. Smilen, Y. Davis, S. Lopez, R. Lapinski and C. J. Lockwood (1998). "Pregnancy outcome and weight gain recommendations for the morbidly obese woman." Obstetrics & Gynecology 91(1): 97-102.
43. Black, M., et al., Maternal overweight and obesity account for a greater proportion of adverse pregnancy outcomes than does gestational diabetes (GDM) defined by International Association of Diabetes in Pregnancy Study Groups (IADPSG) criteria. American Journal of Obstetrics and Gynecology, 2012. 1): p. S121-S122
44. Bowers, D. and W. R. Cohen (1999). "Obesity and related pregnancy complications in an inner-city clinic." Journal of Perinatology 19(3): 216-219.
45. Burstein E, Levy A, Mazor M, Wiznitzer A, Sheiner E. Pregnancy outcome among obese women: a prospective study. Am J Perinatol 2008;25(9):561–6.
46. Callaway LK, Prins JB, Chang AM, McIntyre HD. The prevalence and impact of overweight and obesity in an Australian obstetric population. Med J Aust 2006;184(2):56–9.
47. Choi et al 2011 The effects of pre-pregnancy body mass index and gestational weight gain on perinatal outcomes in Korean women: a retrospective cohort study. Reproductive Biology and Endocrinology 2011, 9:6
48. Choudhry H, Choudhry A, Azam N, Jan S. Effects of obesity on pregnancy and its outcome. Pak Armed Forces J 2009;59:315-9.
49. Clausen T, Oyen N, Henriksen T. Pregnancy complications by overweight and residential area. A prospective study of an urban Norwegian cohort. Acta Obstet Gynecol Scand2006;85:526-33
50. Cnattingius, S., R. Bergström, L. Lipworth and M. S. Kramer (1998). "Prepregnancy weight and the risk of adverse pregnancy outcomes." New England Journal of Medicine 338(3): 147-152.
51. Crane SS, Wojtowycz MA, Dye TD, Aubry RH, Artal R. Association between prepregnancy obesity and the risk of cesarean delivery. Obstet Gynecol 1997;89:213-6.
52. Dodd JM, Grivell RM, Nguyen A, Chan A, Robinson JS. Maternal and perinatal health outcomes by body mass index category. Aust N Z J Obstet Gynaecol 2011;51:136–40.
53. Doherty DA, Magann EF, Francis J, Morrison JC, Newnham JP. Pre-pregnancy body mass index and pregnancy outcomes. Int J Gynaecol Obstet 2006;95:242–247.
54. Driul L, Cacciaguerra G, Citossi A, Martina MD, Peressini L, Marchesoni D. Prepregnancy body mass index and adverse pregnancy outcomes. Arch Gynecol Obstet2008;278:23-6
55. Edwards, L. E., W. L. Hellerstedt, I. R. Alton, M. Story and J. H. Himes (1996). "Pregnancy complications and birth outcomes in obese and normal-weight women: effects of gestational weight change." Obstetrics & Gynecology 87(3): 389-394.
56. Ekblad U, Grenman S. Maternal weight, weight gain during pregnnacy and prenancy outcome Int J Gynaecol Obstet 1992;39:277-283
57. El-Chaar et al. The Impact of Increasing Obesity Class on Obstetrical Outcomes MARCH JOGC 2013. p224
58. El-Chaar, D., S. A. Finkelstein, X. Tu, D. B. Fell, L. Gaudet, J. Sylvain, G. Tawagi, S. W. Wen and M. Walker (2013). "The impact of increasing obesity class on obstetrical outcomes." Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 35(3): 224-233.
59. Flick, A.A., et al., Excessive weight gain among obese women and pregnancy outcomes. American Journal of Perinatology, 2010. 27(4): p. 333-8.
60. Green, C. and D. Shaker (2011). "Impact of morbid obesity on the mode of delivery and obstetric outcome in nulliparous singleton pregnancy and the implications for rural maternity services." Australian & New Zealand Journal of Obstetrics & Gynaecology 51(2): 172-174.
61. Halloran, D.R., et al., Effect of revised IOM weight gain guidelines on perinatal outcomes. Journal of Maternal-Fetal & Neonatal Medicine, 2011. 24(3): p. 397-401
62. Hancke et al Pre-pregnancy obesity compromises obstetric and neonatal outcomes. Journal of Perinatal Medicine. 2014. Volume 43, Issue 2, Pages 141–146
63. Hauger, M. S., Gibbons, L., Vik, T. and Belizan, J. M. (2008), Prepregnancy weight status and the risk

References of studies screened in full and excluded

of adverse pregnancy outcome. Acta Obstetricia et Gynecologica Scandinavica, 87: 953–959.
64. Hoffman, C. S., L. C. Messer, P. Mendola, D. A. Savitz, A. H. Herring and K. E. Hartmann (2008). "Comparison of gestational age at birth based on last menstrual period and ultrasound during the first trimester." Paediatric and Perinatal Epidemiology 22(6): 587-596.
65. Iqbal, Nargis, et al. "A Study of Association of Obesity with Maternal Complications." Annals of King Edward Medical University 19.3 (2014).
66. J.A Kusin, S Kardjati, U.H Renvqist. Maternal body mass index: the functional significance during reproduction. 1994. European Journal of Clinical Nutrition 48 Suppl 3: S56-67.
67. Jensen DM, Damm P, SA˜¸rensen B, MA˜¸lsted-Pedersen L, Westergaard JG, et al. (2003) Pregnancy outcome and prepregnancy body mass index in 2459 glucose tolerant Danish women. American Journal of Obstetrics and Gynecology 189:239–244.
68. Kabiru, W. and B. D. Raynor (2004). "Obstetric outcomes associated with increase in BMI category during pregnancy." American journal of obstetrics and gynecology 191(3): 928-932.
69. Kalk P, Guthmann F, Krause K, Relle K, Godes M, Gossing G, Halle H, Wauer R, Hocher B. Impact of maternal body mass index on neonatal outcome. Eur J Med Res 2009;14:216–222.
70. Kaplan-Sturk etal. Outcome of deliveries in healthy but obese women: obesity and delivery outcome BMC Research Notes 2013, 6:50
71. Kerrigan AM, Kingdon C. Maternal obesity and pregnancy: aretrospective study. Midwifery 2010;26:138–46.
72. Ketterlinus, R. D., S. H. Henderson and M. E. Lamb (1990). "Maternal age, sociodemographics, prenatal health and behavior: Influences on neonatal risk status." Journal of Adolescent Health Care 11(5): 423-431.
73. Kitsantas, P. and L.R. Pawloski, Maternal obesity, health status during pregnancy, and breastfeeding initiation and duration. Journal of Maternal-Fetal & Neonatal Medicine, 2010. 23(2): p. 135-41.
74. Kominiarek MA, Vanveldhuisen P, Hibbard J, Landy H, Haberman S, Learman, L, Wilkins I, Bailit J, Branch W, Burkman R, Gonzales-Quintero VH, Gregory K, Hatjis C, Hoffman M, Ramirez M, Reddy UM, Troendle J, Zhang J for the Consortium on Safe Labor: The maternal body mass index: a strong association with delivery route. Am J Obstet Gynecol 2010, 203(3):264. e261–264.e267.
75. Kominiarek MA, Zhang J, Vanveldhuisen P, Troendle J, Beaver J, Hibbard JU: Contemporary labor patterns: the impact of maternal body mass index. Am J Obstet Gynecol 2011, 205(3):244.e241–244.e248.
76. Korapin Rudtanasudjatum, M. D., and Teerapat Chullapram. "The Association between Obesity and the Risk of Cesarean Delivery and other Adverse Pregnancy Outcomes in Singleton Term Pregnancies."
77. Kumar, A., K. Chaudhary and S. Prasad (2010). "Maternal indicators and obstetric outcome in the north Indian population: A hospital-based study." Journal of Postgraduate Medicine 56(3): 192-195.
78. Kumari, A. S. (2001). "Pregnancy outcome in women with morbid obesity." International Journal of Gynecology & Obstetrics 73(2): 101-107.
79. Le Thai, N., G. Lefebvre, et al. (1992). "[Pregnancy and obesity. A case control study of 140 cases]." Journal de Gynecologie, Obstetrique et Biologie de la Reproduction 21(5): 563-567.
80. Liu, X., Du, J., Wang, G., Chen, Z., Wang, W. and Xi, Q. (2011) Effect of pre-pregnancy body mass index on ad- verse pregnancy outcome in north of China. Archives of Gynecology and Obstetrics, 283, 65-70.
81. Lu, G. C., D. J. Rouse, M. DuBard, S. Cliver, D. Kimberlin and J. C. Hauth (2001). "The effect of the increasing prevalence of maternal obesity on perinatal morbidity." American journal of obstetrics and gynecology 185(4): 845-849.
82. M.A. Kominiarek, J. Zhang, P. Vanveldhuisen, J. Troendle, J. Beaver, J.U. Hibbard. Contemporary labor patterns: the impact of maternal body mass index. American Journal of Obstetrics and Gynecology, 205 (2011), pp. 244–248
83. M.A. Kominiarek, P. Vanveldhuisen, J. Hibbard, et al. The maternal body mass index: a strong association with delivery route American Journal of Obstetrics and Gynecology, 203 (2010), pp. 264–267
84. Magann et al. Pregnancy, obesity, gestational weight gain, and parity as predictors of peripartum complications. Archives of Gynecology and Obstetrics 2010 284:1754
85. Marshall, N. E., C. Guild, Y. W. Cheng, A. B. Caughey and D. R. Halloran (2014). "Racial disparities in pregnancy outcomes in obese women." Journal of Maternal-Fetal and Neonatal Medicine 27(2): 122-126.
86. Marshall, N. E., C. Guild, Y. W. Cheng, A. B. Caughey and D. R. Halloran (2014). "The effect of maternal body mass index on perinatal outcomes in women with diabetes." American Journal of Perinatology 31(3): 249-256.
87. Mobasheri, E. and M. J. Golalipour (2007). "The effect of pre-pregnancy body mass index on

References of studies screened in full and excluded

gestational weight gain and pregnancy outcome in Gorgan, North Iran." Journal of Medical Sciences 7(5): 905-908.
88. Mochhoury, L., R. Razine, J. Kasouati, M. Kabiri and A. Barkat (2013). "Body mass index, gestational weight gain, and obstetric complications in Moroccan population." Journal of pregnancy 2013: 379461.
89. Munim, S. and H. Maheen (2012). "Association of gestational weight gain and pre-pregnancy body mass index with adverse pregnancy outcome." Journal of the College of Physicians and Surgeons--Pakistan : JCPSP 22(11): 694-698.
90. Naeye, R. L. (1990). "Maternal body weight and pregnancy outcome." American Journal of Clinical Nutrition 52(2): 273-279.
91. Nanyonjo, R. D., S. B. Montgomery, N. Modeste and E. Fujimoto (2008). "A secondary analysis of race/ethnicity and other maternal factors affecting adverse birth outcomes in San Bernardino County." Maternal and Child Health Journal 12(4): 435-441.
92. Narchi, H. and Skinner, A. (2010) Overweight and ob- esity in pregnancy do not adversely affect neonatal out- comes: New evidence. Journal of Obstetrics and Gynae- cology, 30, 679-686.
93. Nohr, E. A., M. Vaeth, J. L. Baker, T. I. A. Sorensen, J. Olsen and K. M. Rasmussen (2008). "Combined associations of prepregnancy body mass index and gestational weight gain with the outcome of pregnancy." American Journal of Clinical Nutrition 87(6): 1750-1759.
94. Nohr, E. A., M. Vaeth, J. L. Baker, T. I. A. Sorensen, J. Olsen and K. M. Rasmussen (2009). "Pregnancy outcomes related to gestational weight gain in women defined by their body mass index, parity, height, and smoking status." American Journal of Clinical Nutrition 90(5): 1288-1294.
95. Ogunyemi D, Hullett S, Leeper J, Risk A. Prepregnancy body mass index, weight gain during pregnancy, and perinatal outcome in a rural black population. J Matern Fetal Med1998;7:190-3
96. Oken, E., K. P. Kleinman, S. F. Olsen, J. W. Rich-Edwards and M. W. Gillman (2004). "Associations of seafood and elongated n-3 fatty acid intake with fetal growth and length of gestation: Results from a US pregnancy cohort." American Journal of Epidemiology 160(8): 774-783.
97. Olsen, S. F., M. L. Osterdal, J. D. Salvig, U. Kesmodel, T. B. Henriksen, M. Hedegaard and N. J. Secher (2006). "Duration of pregnancy in relation to seafood intake during early and mid pregnancy: Prospective cohort." European Journal of Epidemiology 21(10): 749-758.
98. Ovesen, P., Rasmussen, S. and Kesmodel, U. (2011) Ef- fect of prepregnancy maternal overweight and obesity on pregnancy outcome. Obstetrics & Gynecology, 118, 305- 312.
99. Park, J. H., B. E. Lee, H. S. Park, E. H. Ha, S. W. Lee and Y. J. Kim (2011). "Association between pre-pregnancy body mass index and socioeconomic status and impact on pregnancy outcomes in Korea." Journal of Obstetrics and Gynaecology Research 37(2): 138-145.
100. Patel, R. R., P. Steer, P. Doyle, M. P. Little and P. Elliott (2004). "Does gestation vary by ethnic group? A London-based study of over 122 000 pregnancies with spontaneous onset of labour." International Journal of Epidemiology 33(1): 107-113.
101. Perlow JH, Morgan MA, Montogomery D, Towers CV, Porto M. Perinatal outcome in pregnancy complicated by massive obesity. Am J Obstet Gynecol 1992;167:958–962.
102. Raja, U. A., T. McAree, P. Bassett and S. Sharma (2012). "The implications of a raised maternal BMI: A DGH experience." Journal of Obstetrics and Gynaecology 32(3): 247-251.
103. Ramos, G. A. and A. B. Caughey (2005). "The interrelationship between ethnicity and obesity on obstetric outcomes." American journal of obstetrics and gynecology 193(3): 1089-1093.
104. Rantakallio et al Maternal build and pregnancy outcome. Journal of Clinical Epidemiology, Volume 48, Issue 2, February 1995, Pages 199–207
105. Rayco-Solon, P., A. J. Fulford and A. M. Prentice (2005). "Maternal preconceptional weight and gestational length." American Journal of Obstetrics & Gynecology 192(4): 1133-1136.
106. Rayis, D. A. Abbaker, A. O. Salih, Y. Adam, I. Obesity and pregnancy outcome in Khartoum, Sudan. 2011. International Journal of Gynaecology and Obstetrics 113(2): 160-161.
107. Reddy, U. M., S. K. Laughon, L. Sun, J. Troendle, M. Willinger and J. Zhang (2010). "Prepregnancy risk factors for antepartum stillbirth in the United States." Obstetrics and Gynecology 116(5): 1119-1126.
108. Reiss, Katharina, et al. "Contribution of overweight and obesity to adverse pregnancy outcomes among immigrant and non-immigrant women in Berlin, Germany." The European Journal of Public Health (2015): ckv072.
109. Retnakaran, R., C. Ye, A. J. G. Hanley, P. W. Connelly, M. Sermer, B. Zinman and J. K. Hamilton (2012). "Effect of maternal weight, adipokines, glucose intolerance and lipids on infant birth weight among women without gestational diabetes mellitus." Cmaj 184(12): 1353-1360.
110. Rezaie, Masomeh, Roonak Shahoei, and Shoaleh Shahghebi. "The effect of maternal body mass index on the delivery route in nulliparous women." Journal of Public Health 5.12 (2013): 493-497.
111. Ricart, W., J. Lopez, J. Mozas, A. Pericot, M. A. Sancho, N. Gonzalez, M. Balsells, R. Luna, A.

References of studies screened in full and excluded

Cortazar, P. Navarro, O. Ramirez, B. Flandez, L. F. Pallardo, A. Hernandez-Mijas, J. Ampudia, J. M. Fernandez-Real and R. Corcoy (2005). "Body mass index has a greater impact on pregnancy outcomes than gestational hyperglycaemia." Diabetologia 48(9): 1736-1742.

112. Roman, H., P. Y. Robillard, T. C. Hulsey, A. Laffitte, K. Kouteich, L. Marpeau and G. Barau (2007). "Obstetrical and neonatal outcomes in obese women." West Indian Medical Journal 56(5): 421-426.
113. Rosenberg TJ, Garbers S, Chavkin W, Chiasson MA. Prepregnancy weight and adverse perinatal outcomes in an ethnically diverse population. Obstet Gynecol. 2003;102:1022–7.
114. Rozlan et al The Association of Gestational Weight Gain and the Effect on Pregnancy Outcome Defined by BMI Group among Women Delivered in Hospital Kuala Lumpur (HKL), Malaysia: A Retrospective Study. Asian Journal of Clinical Nutrition4.4 (2012): 160-167
115. Saereeporncharenkul, K. (2011) Correlation of BMI to pregnancy outcomes in Thai women delivered in Rajavithi Hospital. Journal of the Medical Association of Thailand, 94, S52-S58.
116. Sahu MT, Agarwal A, Das V, Pandey A. Impact of maternal body mass index on obstetric outcome. J Obstet Gynaecol Res 2007;33:655-9.
117. Sarkar, R. K., S. M. Cooley, J. C. Donnelly, T. Walsh, C. Collins and M. P. Geary (2007). "The incidence and impact of increased body mass index on maternal and fetal morbidity in the low-risk primigravid population." Journal of Maternal-Fetal and Neonatal Medicine 20(12): 879-883.
118. Schummers, Laura, et al. "Risk of adverse pregnancy outcomes by prepregnancy body mass index: a population-based study to inform prepregnancy weight loss counseling." Obstetrics & Gynecology 125.1 (2015): 133-143.
119. Sebire, N. J., M. Jolly, J. Harris, L. Regan and S. Robinson (2001). "Is maternal underweight really a risk factor for adverse pregnancy outcome? A population-based study in London." British Journal of Obstetrics and Gynaecology 108(1): 61-66.
120. Sebire, N. J., M. Jolly, J. P. Harris, J. Wadsworth, M. Joffe, R. W. Beard, L. Regan and S. Robinson (2001). "Maternal obesity and pregnancy outcome: A study of 287 213 pregnancies in London." International Journal of Obesity 25(8): 1175-1182.
121. Shah, D., A. Tay, A. Desai, M. Parikh, M. Nauta and W. Yoong (2011). "The obstetric performance of Chinese immigrants residing in the UK." Journal of Obstetrics and Gynaecology 31(6): 480-482.
122. Sherrard A, Platt RW, Vallerand D, Usher RH, Zhang X, Kramer MS. Maternal anthropometric risk factors for caesarean delivery before of after onset of labour. Br J Obstet Gyneacol 2007;114:1088-96.
123. Stamnes Koepp, U. M., L. Frost Andersen, K. Dahl-Joergensen, H. Stigum, O. Nass and W. Nystad (2012). "Maternal pre-pregnant body mass index, maternal weight change and offspring birthweight." Acta Obstetricia et Gynecologica Scandinavica 91(2): 243-249.
124. Suresh, A., A. Liu, A. Poulton, A. Quinton, Z. Amer, M. Mongelli, A. Martin, R. Benzie, M. J. Peek and R. Nanan (2013). "Is maternal abdominal subcutaneous fat thickness a better marker for pregnancy outcomes than body mass index: A stratified cohort study." BJOG: An International Journal of Obstetrics and Gynaecology 120: 94-95.
125. Syngelaki A, Bredaki F.E, Vaikousi E, Maiz N.a, Nicolaides K.H (2011) Body Mass Index at 11–13 Weeks' Gestation and Pregnancy Complications. Fetal Diagnosis and Therapy 30: 250–265.
126. Syngelaki, A., F. E. Bredaki, E. Vaikousi, N. Maiz and K. H. Nicolaides (2011). "Body mass index at 11-13 weeks' gestation and pregnancy complications." Fetal Diagnosis and Therapy 30(4): 250-265.
127. Thuot, M., M. A. Coursol, S. Nguyen, V. Lacasse-Guay, M. F. Beauchesne, A. Fillion, A. Forget, F. Z. Kettani and L. Blais (2013). "Impact of obesity on perinatal outcomes among asthmatic women." Canadian Respiratory Journal 20(5): 345-350.
128. Vahratian, A., V. K. Misra, S. Trudeau and D. P. Misra (2010). "Prepregnancy body mass index and gestational age-dependent changes in lipid levels during pregnancy." Obstetrics and Gynecology 116(1): 107-113.
129. Vrijkotte, T. G. M., N. Krukziener, B. A. Hutten, K. C. Vollebregt, M. Van Eijsden and M. B. Twickler (2012). "Maternal lipid profile during early pregnancy and pregnancy complications and outcomes: The ABCD study." Journal of Clinical Endocrinology and Metabolism 97(11): 3917-3925.
130. Wang, T., J. Zhang, X. Lu, W. Xi and Z. Li (2011). "Maternal early pregnancy body mass index and risk of preterm birth." Archives of Gynecology and Obstetrics 284(4): 813-819.
131. Wataba, K., et al. (2006). "Impact of prepregnant body mass index and maternal weight gain on the risk of pregnancy complications in Japanese women." Acta Obstetricia et Gynecologica Scandinavica 85(3): 269-276.
132. Weiss JL, Malone FD, Emig D, Ball RH, Nyberg DA, Comstock CH, et al. Obesity, obstetric complications and cesarean delivery rate--a population-based screening study. Am J Obstet Gynecol 2004;190:1091-7.
133. Witteveen, Tom, et al. "Overweight and severe acute maternal morbidity in a low-risk pregnant population in the Netherlands." (2013): e74494.

References of studies screened in full and excluded

134. Yao, R., C. V. Ananth, B. Y. Park, L. Pereira, L. A. Plante and C. Perinatal Research (2014). "Obesity and the risk of stillbirth: a population-based cohort study." American Journal of Obstetrics & Gynecology 210(5): 457.e451-459.
135. Yekta, Z., H. Ayatollahi, R. Porali and A. Farzin (2006). "The effect of pre-pregnancy body mass index and gestational weight gain on pregnancy outcomes in urban care settings in Urmia-Iran." BMC Pregnancy and Childbirth 6(15).
136. Zaheri et al. The Effect of Pre Pregnancy Body Mass Index and Gestational Weight Gain on Pregnancy Outcomes. Life Science Journal 2013;10(6s)
137. Zhao, Y. N., Q. Li and Y. C. Li (2014). "Effects of body mass index and body fat percentage on gestational complications and outcomes." Journal of Obstetrics and Gynaecology Research 40(3): 705-710.
138. Rudtanasudjatum, K. and Chullapram, T. (2008) The association between obesity and the risk of cesarean delivery and other adverse pregnancy outcomes in singleton term pregnancies. Thai Journal of Obstetrics and Gynaecology, 16, 139-145.
139. Grossetti, E et al 2004 Obstetrical complications of morbid obesity. Gynecology Journal of Obstetrics and Reproductive Biology, 2004, 33(8):739-744.
140. Chereshneva M, Hinkson L, Oteng-Ntim E. The effects of booking body mass index on obstetric and neonatal outcomes in an inner city UK tertiary referral centre. Obstet Med 2008;1:88–91.
141. Bowers, D. and W. R. Cohen (1998). "Obesity and related pregnancy complications in an inner-city clinic." Journal of perinatology: official journal of the California Perinatal Association 19(3): 216-219.
142. Bergholt T, Lim LK, Jorgensen J, Robson MS. Maternal body mass index in the first trimester and risk of caesarean section in nulliparous women in spontaneous labor. Am J Obstet Gynecol 2007;196:163. e1-163.e5
143. Aviram, A., Hod, M. and Yogev, Y. (2011) Maternal obesity: Implications for pregnancy outcome and long- term risks—A link to maternal nutrition. International Journal of Gynecology & Obstetrics, 115, S6-S10.
144. Norwitz ER et al Prolonged pregnancy. When should we intervene? Clin Obstet Gynecol 2007 50(2) 547
145. Wolfe HM, Gross TL Obesity in pregnancy. Clin Obstet Gynecol 1994;37:596-604
146. Khorshid, E. A. Elbeheidy, T. A. Quinaibi, A. M. Risk of Morbid Obesity with Pregnancy. 2004. Saudi Medical Journal 25(1): 121-122.
147. Gracie SK, Lyon AW, Kehler HL, Pennell CE, Dolan SM, McNeil DA, Siever JE, McDonald SW, Bocking AD, Lye SJ, Hegadoren KM, Olson DM, Tough S: All Our babies cohort study: recruitment of a cohort to predict women at risk of preterm birth through the examination of gene expression profiles and the environment. BMC Pregnancy Childbirth 2010, 10:87.
148. Djelantik, A.A.; Kunst, A.E.; van der Wal, M.F.; Smit, H.A.; Vrijkotte, T.G (2013). “Contribution of Overweight and Obesity to the Occurrence of Adverse Pregnancy Outcomes in a Multiethnic Cohort: Population Attributive Fractions for Amsterdam” Obstetric Anesthesia Digest, 33(1):43-45.
149. Kobayashi, Namiko, and Boon H. Lim. "Induction of labour and intrapartum care in obese women." Best Practice & Research Clinical Obstetrics & Gynaecology 29.3 (2015): 394-405.
150. Satpathy, H. K., A. Fleming, D. Frey, M. Barsoom, C. Satpathy and J. Khandalavala (2008). "Maternal obesity and pregnancy." Postgraduate medicine 120(3): E01-09.
151. Bogaerts, A., et al. (2013). "Obesity in pregnancy: Altered onset and progression of labour." Midwifery 29(12): 1303.
152. Castro, L. C. and R. L. Avina (2002). "Maternal obesity and pregnancy outcomes." Current Opinion in Obstetrics and Gynecology 14(6): 601-606.
153. Catalano PM, Ehrenberg HM: The short- and long-term implications of maternal obesity on the mother and her offspring. BJOG: Int J Obstet Gynaecol 2006, 113(10):1126–1133.
154. Caughey et al Postterm pregnancy: how can we improve outcomes? Obstetrical Gynecol Survey 2008 Nov: 63:715-24
155. Linne Y. Effects of obesity on women's reproduction and complications during pregnancy. Obes Rev. 2004 Aug;5(3):137-43
156. Nuthalapaty, F. S. and D. J. Rouse (2004). "The impact of obesity on obstetrical practice and outcome." Clinical obstetrics and gynecology 47(4): 898-913.
157. Vasudevan, C., M. Renfrew and W. McGuire (2011). "Fetal and perinatal consequences of maternal obesity." Archives of Disease in Childhood-Fetal and Neonatal Edition 96(5): F378-F382.
158. Walker, N. and J. H. Gan (2015). "Prolonged pregnancy." Obstetrics, Gynaecology and Reproductive Medicine 25(3): 83-87.
159. Wolfe, H. (1998) High prepregnancy body-mass index— A maternal-fetal risk factor. The New England Journal of Medicine, 338, 191-192.
160. Stone, R. A., J. Huffman, N. Istwan, C. Desch, D. Rhea, G. Stanziano and S. Joy (2011). "Pregnancy

References of studies screened in full and excluded

outcomes following bariatric surgery." Journal of Women's Health 20(9): 1363-1366.
161. Roopnarinsingh (1999) Obstetric hazards of maternal obesity. Journal of Obstetrics and Gynaecology Vol. 19, No. 5, 474-476
162. Son, G. H., J. H. Kim, J. Y. Kwon, Y. H. Kim and Y. W. Park (2013). "Risk factors for cesarean delivery after induction of labor in nulliparous women with an unfavorable cervix at or beyond 41 weeks of gestation." Gynecologic and Obstetric Investigation 76(4): 254-259.
163. Graves, B. W., S. A. DeJoy, A. Heath and P. Pekow (2006). "Maternal Body Mass Index, Delivery Route, and Induction of Labor in a Midwifery Caseload." Journal of Midwifery and Women's Health 51(4): 254-259.
164. Mandal, D., S. Manda, A. Rakshi, R. P. Dey, S. C. Biswas and A. Banerjee (2011). "Maternal obesity and pregnancy outcome: a prospective analysis." The Journal of the Association of Physicians of India 59: 486-489.
165. Michlin, R., M. Oettinger, M. Odeh, S. Khoury, E. Ophir, M. Barak, M. Wolfson and A. Strulov (2000). "Maternal obesity and pregnancy outcome." The Israel Medical Association journal: IMAJ 2(1): 10-13.
166. Suidan, R. S., J. J. Apuzzio and S. F. Williams (2012). "Obesity, comorbidities, and the cesarean delivery rate." American Journal of Perinatology 29(8): 623-627.
167. Tosson, Madiha M., and Tarek K. Alhussaini. "The impact of maternal obesity on pregnancy outcome at Assuit University Hospital." Ass Univ Bull Env Res 8.2 (2005): 1-11.
168. Oberg et al (2013) Maternal and Fetal Genetic Contributions to Postterm Birth: Familial Clustering in a Population-Based Sample of 475,429 Swedish Births. American Journal of Epidemiology. DOI: 10.1093/aje/kws244
169. Sukalich S, Mingione MJ, Glantz JC. Obstetric outcomes in overweight and obese adolescents. Am J Obstet Gynecol2006;195:851-5
170. Ritho, M.M.K., 2012. Effect of body mass index on pregnancy outcome at Kenyatta National Hospital: Cohort Study (Doctoral dissertation, University of Nairobi, Kenya).

Table S3: Details of included studies as reported in the original papers

Author, publication year, region, country	Methodology	Number of participants: number of cases[1]	Study period	Assessment of weight status	Assessment of gestational age	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Participants per BMI category	Cases per BMI category	Crude analysis (OR and 95% CI unless otherwise specified)	Adjusted analysis (OR and 95% CI unless otherwise specified)	Variables included in adjusted analyses
Abenhaim et al 2007[16] Canada	Retrospective Cohort	18,633:not reported	04/1987 - 03/1997	Pre-pregnancy BMI, method of assessment not reported[#]	Not reported	>37-42 * >42	20-24.9 [+] <19.9 25-29.9 30-39.9 >40	10,015 4,310 3,067 1,137 104	Not reported	Not reported	1(1) 1.07 (0.86-1.33) 1.13 (0.89-1.45) 0.84 (0.55-1.28) 0.76 (0.19-3.10)	Maternal Age Parity Smoking Pre-existing diabetes
Al-Rayyan et al 2010[17] Jordan	Retrospective Cohort	901:109	01/1990 - 12/2000	Early pregnancy measured BMI	Not reported	37-41 * >42	<30 [+] ≥30.0	461 440	55 54	Not reported	Not reported	N/A
Arora et al 2013[18] Thailand	Retrospective Cohort	4,764:32	02/2011 - 08/2012	Pre-pregnancy BMI, method of assessment not reported[#]	Not reported	37-41 * 42	18.5-24.9[+] <18.5 25-29.9 ≥30	3,129 912 535 188	19 7 5 1	Not reported	Not reported	N/A
Arrowsmith et al 2011[19] UK	Retrospective Cohort	20,599:Not reported	01/2004 - 12/2008	Early pregnancy measured BMI	USS	37-41[+2] * 41[+3]	20-24.9[+] <19.9 25-29.9 30-34.9 35-39.9 >40	Not reported	Not reported	Not reported	1(1) 0.75 (0.66-0.85) 1.24 (1.14-1.34) 1.52 (1.37-1.70) 1.75 (1.48-2.07) 2.27 (1.78-2.86)	Maternal age Race Parity Hypertension Diabetes mellitus Smoking
Basu et al 2010[20] South Africa	Retrospective Cohort	738:132	02/2006 and 09/2006	Early pregnancy measured BMI	USS + LMP	37-41 * >41	18.5-24.9[+] 25-29.9 30-39.9 >40	139 273 288 38	18 54 49 11	Not reported	Not reported	N/A
Bhattacharya 2007[21] UK	Retrospective Cohort	21,511:1,374	1976-2005	Early pregnancy measured BMI	USS + LMP	37-41 * >41	20-24.9[+] <19.9 25-29.9 30-34.9 >35	12,539 2,497 4,735 1,615 125	773 108 350 136 7	1 (1) 0.7 (0.6-0.8) 1.2 (1.1-1.3) 1.4 (1.1-1.6) 0.8 (0.4-1.7)	1 (1) 0.9 (0.7-1.1) 0.9 (0.8-1.1) 0.9 (0.7-1.1) 0.8 (0.4-1.8)	Relevant sociodemographic characteristics Year of delivery.
Briese et al 2011[22] Germany	Retrospective Cohort	Not reported	1998-2000	BMI, method of assessment not reported	Not reported	Not reported	18.5-24.9 ≥30	Not reported	Not reported	Not reported	1 (1) 1.45 (1.38-1.52)	Age Smoking status Single mother status Education Only included primiparous women
Caughey et al 2009[23] USA	Retrospective Cohort	Not reported	01/1995 - 12/1999	BMI, method of assessment not reported	Not reported	37-<41* ≥41 37-<42* ≥42	Not obese [+] Obese (BMI not defined)	Not reported	Not reported	Not reported	1 (1) 1.29 (1.18, 1.40) 1 (1) 1.20 (0.99, 1.46)	Excluding chronic hypertension, diabetes mellitus, and gestational diabetes mellitus. Controlling for paternal race/ethnicity.

Author, publication year, region, country	Methodology	Number of participants: number of cases[1]	Study period	Assessment of weight status	Assessment of gestational age	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Participants per BMI category	Cases per BMI category	Crude analysis (OR and 95% CI unless otherwise specified)	Adjusted analysis (OR and 95% CI unless otherwise specified)	Variables included in adjusted analyses
Cedergren 2004[24] Sweden	Retrospective Cohort	580,970: 45,288	01/1992 - 12/2001	Early pregnancy measured BMI	USS	37-41^{+6} * ≥42	19.8-26^{+} 29.1-35 35.1-40 >40	501,954 64,286 11,605 3,125	37,640 6,072 1,197 379	Not reported	1 (1) 1.37 (1.33-1.41) 1.49 (1.40-1.58) 1.80 (1.62-2.01)	Maternal age Parity Smoking Year of birth
Denison et al 2008[25] Sweden	Retrospective Cohort	143,519:9,759	1998-2002	Early pregnancy measured BMI	USS + LMP	37-41^{+6} * ≥42	20-25^{+} <20 25-<30 30-<35 ≥35	84,963 18,227 30,139 7,463 2,440	Not reported	Term median BMI 22.9 (IQR 21.0–25.3) Postdate median BMI 23.4 (IQR 21.5–26.0) p<0.0001	Not reported	N/A
El-Gilany and Hammad 2010[26] Saudi Arabia	Prospective Cohort	787:22	01/2007-12/2007	Early pregnancy measured BMI	LMP	37-42 * >42	18.5-24.9^{+} <18.5 25-29.9 ≥30	307 67 187 226	4 2 5 11	RR (95% CI) 1 (1) 2.3 (0.4-12.3) 2.0 (0.6-7.1) 3.7 (1.2-11.6)	Not reported	N/A
Halloran et al 2012[27] USA	Retrospective Cohort	267,126: 51,420 267,126: 13,392	2000-2006	Self-report pre-pregnancy BMI	Clinical measurement	37-40 * =41 =42	18.5-24.9^{+} <18.5 25-29.9 ≥30 18.5-24.9^{+} <18.5 25-29.9 ≥30	180,056 19,354 76,792 62,924 180,056 19,354 76,792 62,924	26,487 2,783 11,794 10,356 6,866 853 2,997 2,676	Not reported	Not reported	N/A
Johnson et al 1992[28] USA	Retrospective Cohort	3,203:314	01/1987-12/1989	Self-report pre-pregnancy BMI	USS	38-42 * >42	<19.8^{+} 19.8-26 27-29 >29	755 1,633 329 486	61 157 40 56	1 (1) 1.22 (0.89-1.66) 1.58 (1.03-2.4) 1.49 (1.01-2.2)	Not reported	N/A
Khashan and Kenny 2009[29] UK	Retrospective Cohort	89,513:4,706	01/2004-12/2006	Early pregnancy measured BMI	USS + LMP	Not reported* ≥41	18.5-24.9^{+} <18.5 25-29.9 30-40 >40	42,147 2325 23,757 13,386 1,543	2,213 99 1,404 897 93	1 (1) 0.79 (0.65-0.96) 1.13 (1.06-1.21) 1.28 (1.19-1.38) 1.17 (0.95-1.43)	1 (1) 0.81 (0.67-0.99) 1.17 (1.09-1.25) 1.35 (1.25-1.45) 1.24 (1.02-1.52)	Maternal age Parity Race
Kistka et al 2007[30] USA	Retrospective Cohort	368,633:Not reported	1989-1997	BMI, method of assessment not reported	Not reported	37-41+6 * ≥42	Reference not defined^{+} <20 >35	Not reported	Not reported	1 (1) 0.90 (0.88-0.93) 1.25 (1.19-1.32)	1 (1) 0.85 (0.82-0.87) 1.23 (1.16-1.29)	Socioeconomic status Maternal medical risk factors Year of delivery
Kitiyodom and Tongswatwong 2008[31] Thailand	Retrospective Cohort	1,350:166	10/2004-09/2006	Early pregnancy measured BMI	USS + LMP	Reference not defined^{+} Post-term not defined	20-24.9^{+} >25	1,020 330	110 56	1 (1) 1.7 (1.19-2.44)	Not reported	N/A
Knight et al 2010[32] UK	Prospective Cohort	1,280:56	09/2007-08/2008	Pregnancy measured BMI	Not reported	Reference not defined $^{+}$ >42	<50^{+} ≥50	630 650	24 32	1 (1) 1.31 (0.76-2.25)	1 (1) 1.35 (0.77-2.37)	Maternal age Parity Socioeconomic status Ethnicity Smoking

Author, publication year, region, country	Methodology	Number of participants: number of cases[1]	Study period	Assessment of weight status	Assessment of gestational age	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Participants per BMI category	Cases per BMI category	Crude analysis (OR and 95% CI unless otherwise specified)	Adjusted analysis (OR and 95% CI unless otherwise specified)	Variables included in adjusted analyses
Konje et al 1993[33] UK	Case Control	760:14	01/1989-06/1990	Early pregnancy measured BMI	USS	37-42 * >42	17-24[+] 30.4-53.0	299 461	11 3	Not reported	Not reported	N/A
Leung et al 2008[34] Hong Kong	Retrospective Cohort	27,372:4,118	01/1995-12/2005	Early pregnancy BMI	Not reported	37-40+6 * ≥41	18.5-<23[+] <18.5 ≥23-<25 ≥25-<27.5 ≥27.5-<30 ≥30	16,303 2,434 4,346 2,617 1,062 610	2,430 322 654 429 175 108	Not reported	1 (1) 0.84 (0.74-0.95) 1.06 (0.97-1.17) 1.21 (1.08-1.36) 1.25 (1.05-1.48) 1.34 (1.09-1.66)	Only included Chinese ethnicity. Adjusted for confounding factors, not specified.
Lumme et al 1995[35] Finland	Prospective Cohort	8,719:439	07/1985-06/1986	Early pregnancy measured BMI	Not reported	37-41 * >41	19-24.9[+] <19 25-29.9 ≥30	1,037 6,173 1,177 332	136 228 63 12	Not reported	1 (1) 1.0 (0.7-1.4) 1.6 (1.2-2.1) 1.1 (0.6-1.9)	Maternal age Parity Education Smoking Diabetic and Hypertensive complications
Mancuso et al 1991[36] Italy	Case Control	138:4	Not reported	Self-report pre-pregnancy BMI	Not reported	38-41 * >42	15.2-26.6[+] >30	82 56	1 3	Not reported	Not reported	N/A
Manzanares et al 2012[37] Spain	Case Control	2,714:196	2007-2009	Early pregnancy measured BMI	Not reported	37-41[+2] * >41[+3]	18.5-25[+] <18.5 >35	2,341 147 226	174 12 10	Not reported	1 (1) 0.81 (0.35-1.91) 0.72 (0.34-1.55)	Maternal age Parity Hypertension Diabetes
Morgan et al 2014[38] UK	Prospective Cohort	440:28	11/2010-02/2013	Pre-pregnancy BMI, method of assessment not reported[#]	USS	Reference not defined [+] =42	18.5-24.9[+] 25-29.9 >29.9	234 206	10 18	1 (1) 2.18 (0.99-4.84)	Not reported	N/A
Navid et al 2013[39] Pakistan	Case Control	200:57	05/2011 - 07/2012	Early pregnancy BMI, method of assessment not reported	USS	37-40* >40	18-24.9[+] 25-35	100 100	25 32	Not reported	Not reported	N/A
Nohr et al 2009[40] Denmark	Prospective Cohort	4,700:1,541	1996-2002	Self-reported pre-pregnancy BMI	Not reported	37-41* >41	15-33.3[+] 32.6-<35 35-<37.5 ≥37.5	2,354 853 721 770	688 292 277 283	Not reported	1 (1) 1.3 (1.1-1.5) 1.5 (1.3-1.8) 1.4 (1.2-1.7)	Age Parity Maternal height Smoking Alcohol consumption Physical exercise Social group
Olesen et al 2006[41] Denmark	Retrospective Cohort	47,338:5,227	1996-2004	BMI –self reported	LMP + USS	37- 41[+6] * ≥42	20-24[+] <20 25-29 30-34 ≥35	26,486 7,918 9,201 2,713 1,020	2,800 736 1,165 374 152	1 0.87 1.23 1.35 1.48 95%CI not reported	1 (1) 0.87 (0.80-0.94) 1.24 (1.15-1.34) 1.37 (1.22-1.54) 1.52 (1.28-1.82)	Maternal age Parity

Author, publication year, region, country	Methodology	Number of participants: number of cases[1]	Study period	Assessment of weight status	Assessment of gestational age	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Participants per BMI category	Cases per BMI category	Crude analysis (OR and 95% CI unless otherwise specified)	Adjusted analysis (OR and 95% CI unless otherwise specified)	Variables included in adjusted analyses
Raatikainen et al 2006[42] Finland	Retrospective Cohort	25,601:1,233	01/1989 - 12/2001	Early pregnancy measured BMI	Not reported	Reference not defined [+] >42	≤25[+] 26-29 ≥30	20,333 3,388 1,880	935 193 105	Not reported	Not reported	N/A
Robinson et al 2005[43] Canada	Retrospective Cohort	84,055:5,689	01/1988 - 12/1992	Pre-pregnancy BMI, method of assessment not reported[#]	Not reported	Reference not defined [+] >41	55-75Kg[+] ≥90-120Kg >120Kg	74,566 8,774 715	4,997 647 45	1 (1) 1.10 (1.01-1.20) 0.91 (0.67-1.23)	1 (1) 1.18 (1.08-1.28) 0.99 (0.74-1.34)	Maternal age Marital status Parity Smoking Socioeconomic status
Rode et al 2005[44] Denmark	Prospective Cohort	8,463:Not reported	1998 - 2001	Self-report pre-pregnancy BMI	USS	37-42* >42	<25[+] 25-29.9 ≥30	Not reported	Not reported	Not reported	1 (1) 1.4 (1.2-1.7) 1.4 (1.1-1.9)	Maternal age Smoking Ethnic background Type of conception
Roos et al 2010[45] Sweden	Retrospective Cohort	972,883: 85,488	01/1992 - 12/2006	Early pregnancy measured BMI	USS + LMP	37-41+6* ≥42	20-24.9[+] <20 25-29.9 ≥30	560,667 105,643 224,550 82,013	46,323 6,486 22,834 9,845	Not reported	1 (1) 0.74 (0.72-0.76) 1.31 (1.29-1.33) 1.63 (1.59-1.67)	Maternal age Parity Education BMI Smoking Country of origin Mother living with father
Schrauwers and Dekker 2009[46] Australia	Retrospective Cohort	348:3	01/2006 - 06/2006	Early pregnancy BMI, method of assessment not reported	Not reported	37-41* >41	19.1-25[+] 25.1-30 30.1-40 >40	93 92 108 55	0 1 2 0	Not reported	Not reported	N/A
Scott-Pillai et al 2013 [47] UK	Retrospective Cohort	30,298:Not reported	2004-2011	Early pregnancy measured BMI	Not reported	Reference not defined [+] >41	18.5-24.99[+] <18.50 25-29.99 30-34.99 35-39.99 ≥40	Not reported	Not reported	Not reported	1 (1) 0.5 (0.2-1.0) 0.9 (0.7-1.1) 0.8 (0.5-1.1) 0.9 (0.5-1.6) 0.8 (0.4-1.7)	Age Parity Year of birth Social deprivation Smoking
Sharief and Tarik 2000[48] Iraq	Prospective Cohort	40:6	12/1997-08/1998	Early pregnancy measured weight	Not reported	Reference not defined [+] Post-term not defined	<=90Kg >90Kg	20 20	3 3	Not reported	Not reported	N/A
Stotland et al 2007[49] USA	Retrospective Cohort	10,878:2,402 10,878:595	1990-2001	Self-report pre-pregnancy BMI	USS + LMP	37-<41* ≥41 37-<42* ≥42	19.8-26[+] <19.8 26.1-29 >29	6,477 2,171 1,213 1,017 6,477 2,171 1,213 1,017	1,418 397 297 290 350 83 89 73	Not reported	1 (1) 0.83 (0.72-0.95) 1.29 (1.10-1.52) 1.81 (1.50-2.18) 1 (1) 0.78 (0.60-1.01) 1.51 (1.15-1.97) 1.69 (1.23-2.31)	Maternal age Ethnicity Parity Gestational weight gain Insurance status Hypertension Diabetes Smoking
Usha Kiran et al 2005[50] UK	Retrospective Cohort	8,350:2,768	1990-1999	Early pregnancy measured BMI	USS	37-41* >41	20-30[+] >30	7,673 677	2,490 278	1 (1) 1.4 (1.2-1.7)	Not reported	N/A

Author, publication year, region, country	Methodology	Number of participants: number of cases[1]	Study period	Assessment of weight status	Assessment of gestational age	Gestational age groups (weeks)	BMI (kg/m^2) or weight category	Participants per BMI category	Cases per BMI category	Crude analysis (OR and 95% CI unless otherwise specified)	Adjusted analysis (OR and 95% CI unless otherwise specified)	Variables included in adjusted analyses
Vaswani and Balachandran 2013[51] United Arab Emirates	Retrospective Cohort	1,985:147	12/2010 - 10/2011	Early pregnancy measured BMI	Not reported	37-41* >41	18.5-24.9$^+$ 25-29.9 30-34.9 35-39.9 ≥40	420 635 520 280 130	20 48 43 24 12	Not reported	1 (1) 1.54 (0.89-2.65) 1.69 (0.96-2.98) 1.78 (0.93-3.42) 2.99 (1.35-6.65)	Age Parity Hypertension Diabetes
Vinturache et al 2014[52] Canada	Prospective Cohort	1,996:5	05/2008 - 12/2010	Self-report pre-pregnancy BMI	Not reported	37-41^{+6} * ≥42	18.5-24.99$^+$ 25-29.99 ≥30	1,313 472 211	4 1 0	Not reported	Not reported	N/A
Voigt et al 2008[53] Germany	Retrospective Cohort	303,960: 34,266	1998-2000	Pre-pregnancy BMI, method of assessment not reported[#]	Not reported	Term, not defined $^+$ Post-term, not defined	18.5-24.99$^+$ 40-44.99 ≥45	300,299 2,946 715	33,703 452 111	Not reported	Not reported	N/A
Yazdani et al 2006[54] Iran	Retrospective Cohort	966:33	2008-2009	Early pregnancy BMI, method of assessment not reported	USS + LMP	Term, not defined $^+$ Post-term, not defined	20-24.9$^+$ ≤19.9 25-29.9 30-34.9 >35	403 126 340 92 5	14 4 12 3 0	Not reported	Not reported	N/A

Footnote: [1] In studies which presented data for preterm, term and post-term births, the numbers of participants and cases were calculated following exclusion of pre-term births when possible. [#]Weight assessment is presumed to be self-reported as pre-pregnancy BMI was used, although this was not explicitly stated. $^+$ Reference group for BMI. * Reference group for gestational age. Abbreviations: BMI = body mass index; CI = confidence interval; IQR = inter quartile range; LMP = last menstrual period; N/A = not applicable; OR = odds ratio; RR = relative risk; USS = ultrasound scan

Table S4: Contacting authors for additional information

Paper	Reason For Contacting	Original Data (BMI Kg/m^2)	Original Data (Participants:Cases)	Author Response[#]	Definitions Provided	Data Provided (BMI Groups)	Data Provided (Participants:Cases)
Abenhaim et al 2007[16]	• To provide frequencies for cases^ • Split BMI 30-39.9 into WHO obesity classes I and II	20-24.9 <19.9 25-29.9 30-39.9 >40	10,015:not reported 4,310:not reported 3,067:not reported 1,137:not reported 104:not reported	Unable to provide data	N/A	N/A	Not provided[l]
Al-Rayyan et al 2010[17]	• To provide frequencies according to specified WHO BMI categories^	<30 >30	461:55 440:54	No response	N/A	N/A	Not provided[l]
Arora et al 2013[18]	• To provide frequencies for WHO BMI categories >30	>30	188:1	Additional data provided	N/A	30-34.9 35-39.9 ≥40	159:0 35:0 9:1
Arrowsmith et al 2011[19]	• To provide frequencies for participants and cases^	20-24.9 <19.9 25-29.9 30-34.9 35-39.9 >40	Not reported	Additional data provided	N/A	20-24.9[+] <19.9 25-29.9 30-34.9 35-39.9 >40	9,374:2,193 2,002:367 5,262:1,428 2,028:634 697:234 298:123
Basu et al 2010[20]	• Split BMI 30-39.9 into WHO obesity classes I and II	30-39.9	298:49	No response	N/A	N/A	Not provided
Bhattacharya et al 2007[21]	• Definition used for comparison group for gestational age	N/A	N/A	Definition provided	37-42	N/A	N/A
Briese et al 2011[22]	• Definition for gestational age reference group • Definition used for post-term • To provide frequencies for participants and cases^	18.5-24.9 ≥30	Not reported	Provided definitions. Unable to provide frequencies.	>37-<42 ≥42	N/A	Not provided[l]
Caughey et al 2009[23]	• To provide frequencies according to specified WHO BMI categories^	Not reported	Not reported	Unable to provide data	N/A	Not provided	Not provided[l]
Cedergren 2004[24]	• To provide frequencies the BMI category >26-29.	19.8-26 29.1-35 35.1-40 >40	501,954:37,640 64,286:6,072 11,605:1,197 3,125:379	Additional data provided	N/A	26.1-29	95,675:8,381

Paper	Reason For Contacting	Original Data (BMI Kg/m^2)	Original Data (Participants:Cases)	Author Response[#]	Definitions Provided	Data Provided (BMI Groups)	Data Provided (Participants:Cases)
Denison et al 2008[25]	• To provide frequencies according to specified WHO BMI categories^	20-24.9 <20 25-29.9 30-34.9 ≥35	Not reported	Unable to provide data	N/A	N/A	Not provided[I]
El-Gilany and Hammad 2010[26]	• Split BMI ≥30 into WHO obesity classes	≥30	226:11	Additional data provided	N/A	30-34.9 35-39.9 ≥40	138:1 59:4 29:6
Halloran et al 2012[27]	• Split BMI ≥30 into WHO obesity classes for 41 and 42 weeks gestation	**41** ≥30 **42** ≥30	 62,924:10,356 62,924:2,676	Additional data provided	N/A	**41** 30-34.9 35-39.9 ≥40 **42** 30-34.9 35-39.9 ≥40	 35,767:5,832 16,802:2,741 10,355:1,777 35,767:1,491 16,802:743 10,355:442
Johnson et al 1992[28]	• Split BMI >29 into WHO obesity classes	>29	486:56	Unable to provide data	N/A	N/A	Not provided
Khashan and Kenny 2009[29]	• Split BMI 30-40 into WHO obesity classes • Definition of gestational age reference group	30-40	12,489:897	Additional data provided	37-<42	30-34.9 35-39.9	9,983:650 3,574:247
Kistka et al 2007[30]	• Definition of BMI reference group • To provide frequency data^	Reference group not reported <20 >35	Not reported	Unable to provide data	N/A	N/A	Not provided[I]
Kitiyodom and Tongswatwong 2008[31]	• Split BMI >25 into WHO categories^ • Definition of gestational age reference group and post-term	>25	330:56	Additional data provided	37-<42 ≥42	25-29.9 30-34.9 35-39.9 ≥40	211:25 52:24 21:6 2:1
Knight et al 2010[32]	• Split BMI <50 into WHO categories^ • Definition of gestational age reference group	<50	630:24	Additional data provided	37-<42	18.5-24.9[+] <18.5 25-29.9 30-34.9 35-39.9 ≥40	267:12 15:0 173:7 77:3 28:2 11:0

Paper	Reason For Contacting	Original Data (BMI Kg/m^2)	Original Data (Participants:Cases)	Author Response[#]	Definitions Provided	Data Provided (BMI Groups)	Data Provided (Participants:Cases)
Konje et al 1993[33]	• To provide frequencies for specific BMI groups >25	Not reported	299:11 461:3	Unable to provide data	N/A	Not provided	Not provided
Leung et al 2008[34]	• To provide frequencies for specific BMI groups >30	≥30	610:108	No response	N/A	N/A	Not provided
Lumme et al 1995[35]	• To provide frequencies for specific BMI groups >30	≥30	332:12	No response	N/A	N/A	Not provided
Mancuso et al 1991[36]	• To provide frequencies according to specified WHO BMI categories^	15.2-26.6 >30	82:1 56:3	No response	N/A	N/A	Not provided[l]
Manzanares et al 2012[37]	• To provide frequencies for BMI groups 25-29.9, 30-34.9, 35-39.9, ≥40	18.5-25 >35	2,341:174 226:10	Additional data provided	N/A	25-29.9 30-34.9 35-39.9 ≥40	914:64 321:19 129:6 86:4
Morgan et al 2014[38]	• To provide frequencies for BMI groups 25-29.9 • Split >29.9 into WHO obesity classes • Definition for gestational age reference group.	18.5-24.9 >29.9	234:10 206:18	Provided definition for gestational age. Unable to provide frequency data	37-<42	N/A	Not provided
Navid et al 2013[39]	• Split BMI group 25-35^	18-24.9[+] 25-35	100:25 100:32	No response	N/A	N/A	Not provided[l]
Nohr et al 2009[40]	• To provide frequencies according to specified WHO BMI categories^	15-33.3 32.6-<35 35-<37.5 ≥37.5	2,354:688 853:292 721:277 770:283	Additional data provided	N/A	18.5-24.9 <18.5 25-29.9 30-34.9 35-39.9 ≥40	1,261:71 87:3 332:17 677:40 731:50 272:22
Olesen et al 2006[41]	• Split BMI ≥35	≥35	1,020:154	Unable to provide data	N/A	N/A	Not provided
Raatikainen et al 2006[42]	• Split BMI ≥30 into obesity classes I-III • Definition for gestational age reference group	≤25 26-29 ≥30	20,333:935 3,388:193 1,880:105	No response	Not provided*	Not provided	Not provided

Paper	Reason For Contacting	Original Data (BMI Kg/m^2)	Original Data (Participants:Cases)	Author Response#	Definitions Provided	Data Provided (BMI Groups)	Data Provided (Participants:Cases)
Rode et al 2005[44]	• To provide frequencies of participants and cases according to specified WHO BMI categories^	<25+ 25-29.9 ≥30	Not reported	Additional data provided	N/A	18.5-24.9 <18.5 25-29.9 30-34.9 35-39.9 ≥40	5,986:567 364:25 1,298:162 326:39 81:12 37:3
Roos et al 2010[45]	• Split BMI ≥30 into obesity classes I-III	≥30	82,013:9,845	Unable to provide data	N/A	Not provided	Not provided
Scott-Pillai et al 2013[47]	• To provide frequencies of participants and cases^ • Definition for gestational age reference group	18.5-24.99 <18.50 25-29.99 30-34.99 35-39.99 ≥40	Not reported	Additional data provided	>37-41	18.5-24.99 <18.50 25-29.99 30-34.99 35-39.99 ≥40	15,046:3,261 803:149 7,917:1,776 3,120:667 1,121:238 541:121
Stotland et al 2007[49]	• To split BMI groups >29 into obesity classes I-III for both 41 and 42 weeks gestation	**41** >29 **42** >29	1,017:290 1,017:73	Unable to provide data	N/A	N/A	Not provided
Usha Kiran et al 2005[50]	• To split BMI groups 20-30 and >30 according to WHO BMI categories^	20-30 >30	7,673:2,490 677:278	Unable to provide data	N/A	N/A	Not provided[l]
Voigt et al 2008[53]	• To provide frequencies for WHO categories between 25 and 39.9 • Definitions for gestational age reference group and post-term	18.5-24.99+ 40-44.99 ≥45	300,299:33,703 2,946:452 715:11	Provided definitions. Unable to provide frequencies.	37-<42 ≥42	Not provided	Not provided
Yazdani et al 2006[54]	• Definitions for gestational age reference group and post-term	N/A	N/A	No response	Not provided*	N/A	N/A

Footnote: # Non-responding authors contacted up to three times
^ Essential data request for inclusion in meta-analysis
[l] Excluded from meta-analysis after contacting author, due to lack of essential data,
* Assumptions made as per methods section of manuscript.

Table S5: Quality scores for all included studies

Paper	Newcastle Ottawa Scale Question number and score allocated								Independent reviewer initials
	1	2	3	4	5	6	7	Total Stars	
Abenhaim et al 2007 [16]	a *	a *	c	b *	d	b	c	3	LC & LH
Al-Rayyan et al 2010 [17]	d	a *	a *	c	d	b	d	2	LC & NH
Arora et al 2013 [18]	b *	a *	d	c	d	b	b *	3	NH & LH
Arrowsmith et al 2011 [19]	a *	a *	a *	a&b**	b *	a *	b *	8	LC & NH
Basu et al 2010 [20]	b *	a *	d	c	b *	b	d	3	NH & LH
Bhattacharya et al 2007 [21]	c	a *	a *	b *	b *	b	b *	5	JR & LH
Briese et al 2011[22]	a *	a *	d	b *	d	b	a *	4	LC & NH
Caughey et al 2009 [23]	a *	a *	d	b *	d	a *	d	4	LH & NH
Cedergren 2004 [24]	a *	a *	d	b *	b *	b	b *	5	NH & LH
Denison et al 2008 [25]	a *	a *	a *	c	b *	a *	c	5	LC & LH
El Gilany & Hammad 2010 [26]	a *	a *	a *	c	c		c	3	LC & LH
Halloran et al 2012 [27]	a *	a *	c	b *	b *	b	b *	5	LC & NH
Johnson et al 1992 [28]	b *	a *	c	b *	b *	b	b *	5	LC & NH
Khashan & Kenny 2009 [29]	a *	a *	a *	b *	b *	b	c	5	LC & NH
Kistka et al 2007 [30]	c	a *	d	b *	b *	b	b *	4	LH & JR
Kitiyodom & Tongswatwong 2008 [31]	d	a *	a *	c	b *	b	d	3	NH & RV
Knight et al 2010 [32]	b *	a *	d	b *	d	b	b *	4	LC & NH
Konje et al 1993 [33]	c	a *	a *	b *	b *	b	d	4	NH & LH
Leung et al 2008 [34]	a *	a *	d	b *	d	b	b *	4	LC & LH
Lumme et al 1995 [35]	a *	a *	b *	c	d	b	b *	4	LC & NH
Mancuso et al 1991 [36]	d	a *	d	c	d	b	d	1	LC & NH
Manzanares et al 2012 [37]	a *	a *	a *	b *	d	b	c	4	LC & NH
Morgan et al 2014 [38]	b *	a *	d	b *	b *	b	c	4	LC & LH
Navid et al 2013 [39]	d	a *	d	c	a *	b	d	2	NH & LH
Nohr et al 2009 [40]	b *	a *	c	b *	d	b	b *	4	NH & LH
Olesen et al 2006 [41]	b *	a *	c	b *	c	b	d	3	LH & LC
Raatikianen et al 2006 [42]	a *	a *	a *	b *	d	b	b *	5	LH & JR
Robinson et al 2005 [43]	a *	a *	d	b *	d	b	b *	4	NH & LH

Paper	Newcastle Ottawa Scale Question number and score allocated								Independent reviewer initials
	1	2	3	4	5	6	7	Total Stars	
Rode et al 2005 [44]	b *	a *	c	b *	a *	b	b *	5	NH & LC
Roos et al 2010 [45]	a *	a *	a *	a&b**	b *	a *	b *	8	NH & LH
Schrauwers & Dekker 2009 [46]	b *	a *	d	c	d	b	d	2	LH & NH
Scott-Pillai et al 2013 [47]	a *	a *	a *	a&b**	d	a *	b *	7	LC & NH
Sharief & Tarik 2000 [48]	c	a *	a *	b *	d	b	d	3	LH & NH
Stotland et al 2007 [49]	a *	a *	d	a&b**	b *	a *	d	6	NH & JR
Usha Kiran et al 2004 [50]	c	a *	a *	c	b *	b	b *	4	LC & JR
Vaswani and Balachandran 2013 [51]	a *	a *	a *	b *	d	b	d	4	LH & NH
Vinturache et al 2014 [52]	b *	a *	c	b *	d	a *	b *	5	NH & LH
Voigt et al 2008 [53]	a *	a *	d	c	d	b	d	2	LC & NH
Yazdani et al 2012 [54]	c	a *	d	c	b *	b	c	2	NH & RV

Footnote: Newcastle-Ottawa question numbers 1-7, answers a-d, and associated number of stars (*) are detailed in fig. S2. Minimum number of possible stars to be awarded = 0, maximum number of possible stars to be awarded = 8. Reviewers initials relate to manuscript authors JR: Judith Rankin, LC: Lisa Crowe, LH: Louise Hayes, NH: Nicola Heslehurst, and RV: Rute Vieira.

Figure S3: Exploration of the use of adjusted or unadjusted data for post-term birth (≥ 42 weeks and ≥ 41 weeks) meta-analysis

Figure S3a) Association between maternal BMI and post-term birth ≥42 weeks: unadjusted data

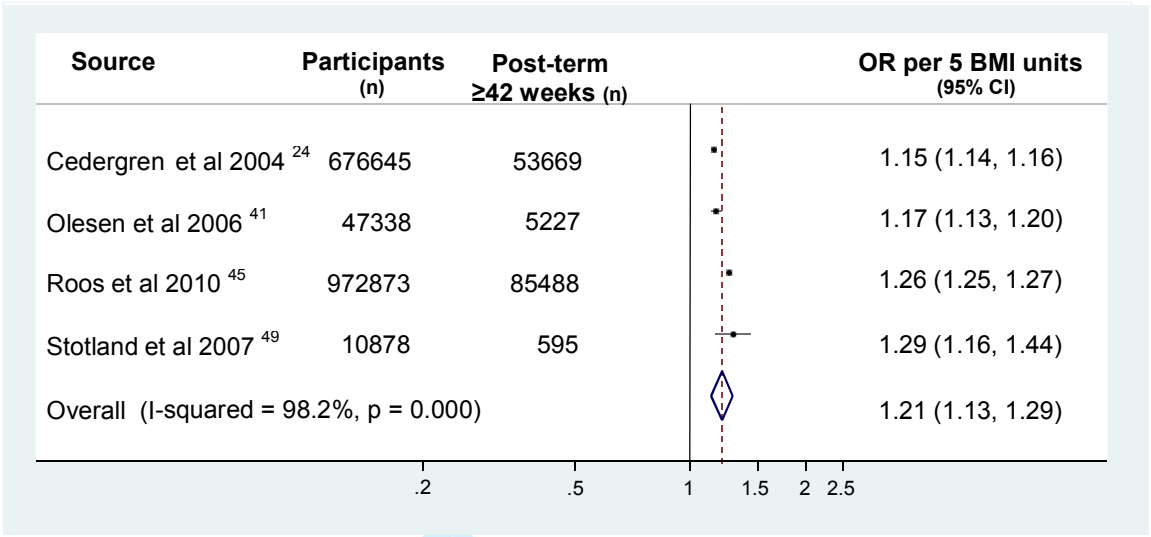


Figure legend: Meta-analysis of the four studies which provided both unadjusted and adjusted data for maternal BMI and post-term birth, showing the overall effect size (OR) and 95% confidence interval for the association when using the unadjusted data to compute the OR for the continuous BMI. Abbreviations: OR = odds ratio; BMI = body mass index; n = number of individuals.

Figure S3b) Association between maternal BMI and post-term birth ≥42 weeks: adjusted data

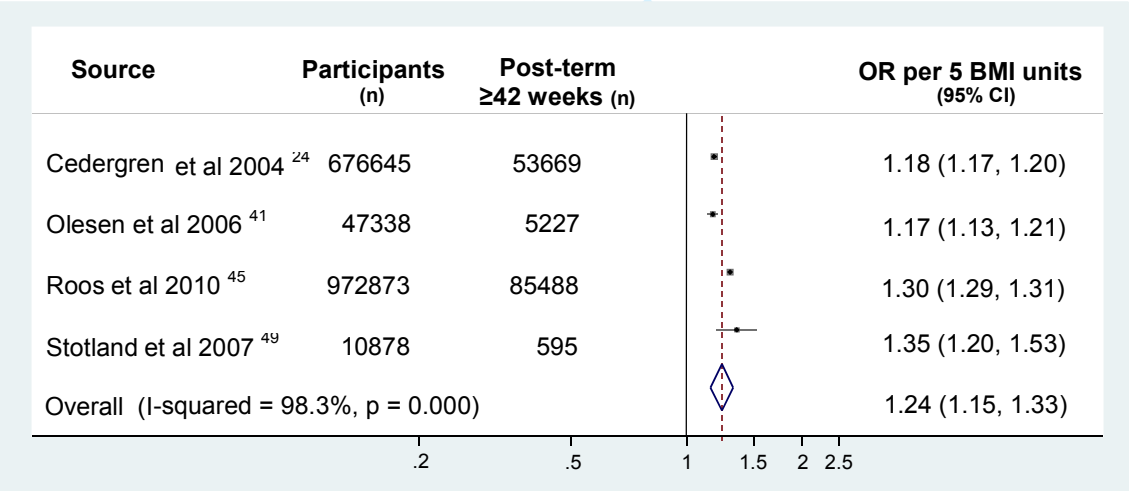


Figure legend: Meta-analysis of the four studies which provided both unadjusted and adjusted data for maternal BMI and post-term birth, showing the overall effect size (OR) and 95% confidence interval for the association when using the adjusted data to compute the OR for the continuous BMI. Abbreviations: OR = odds ratio; BMI = body mass index; n = number of individuals.

Figure S3c) Association between maternal BMI and post-term birth ≥41 weeks: unadjusted data

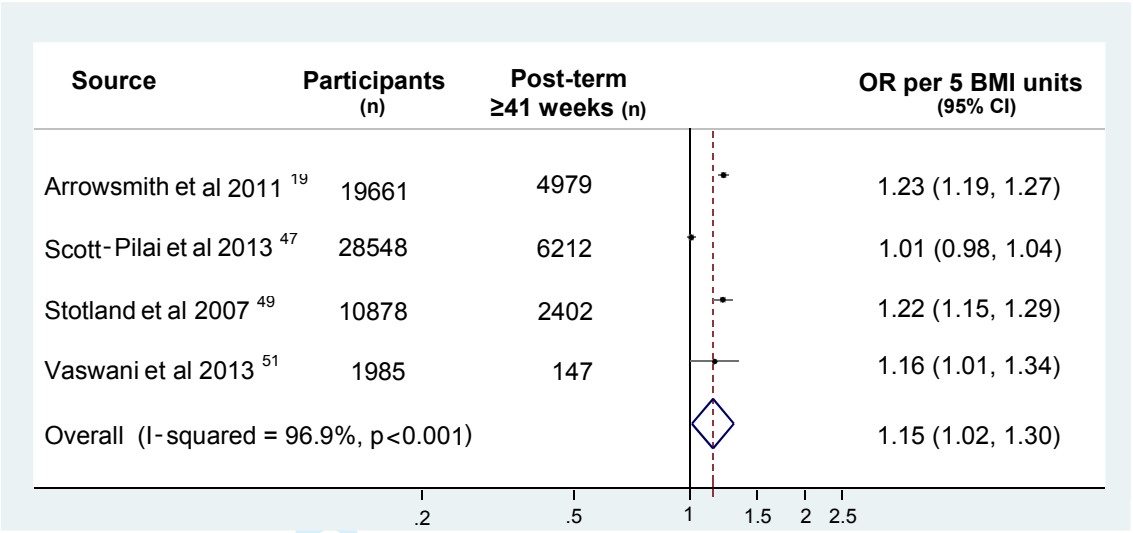


Figure legend: Meta-analysis of the four studies which provided both unadjusted and adjusted data for maternal BMI and post-term birth, showing the overall effect size (OR) and 95% confidence interval for the association when using the unadjusted data to compute the OR for the continuous BMI. Abbreviations: OR = odds ratio; BMI = body mass index; n = number of individuals.

Figure S3d) Association between maternal BMI and post-term birth ≥41 weeks: adjusted data

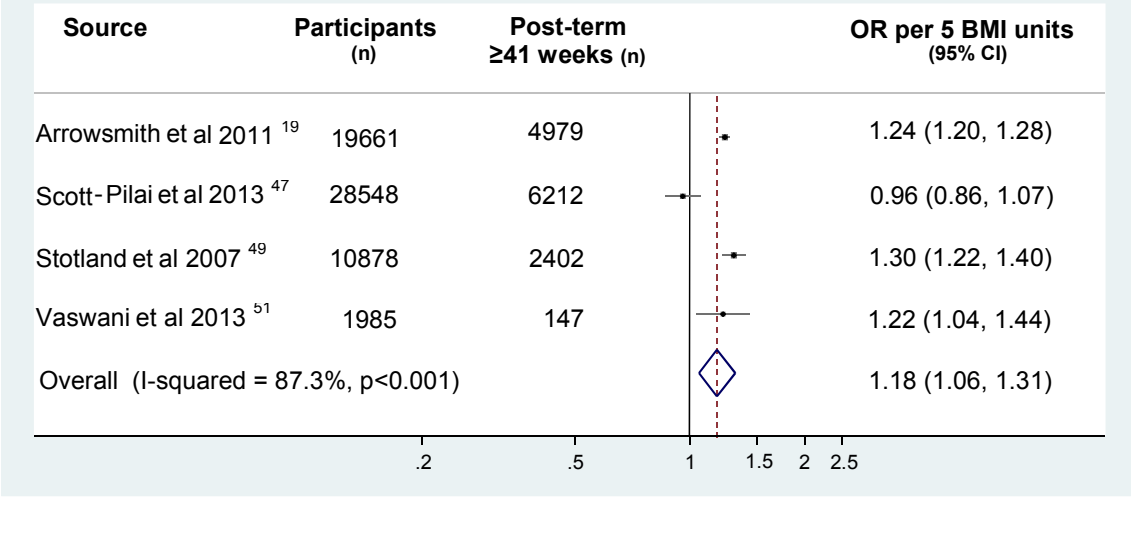


Figure legend: Meta-analysis of the four studies which provided both unadjusted and adjusted data for maternal BMI and post-term birth, showing the overall effect size (OR) and 95% confidence interval for the association when using the adjusted data to compute the OR for the continuous BMI. Abbreviations: OR = odds ratio; BMI = body mass index; n = number of individuals; CI = confidence interval.

Figure S4: Sensitivity analysis for transforming Asian-specific BMI reference criteria for the analysis of maternal BMI and post-term birth ≥41 weeks

Figure S4a) Association between maternal BMI and post-term birth using Asian-specific BMI criteria for Leung et al[34]

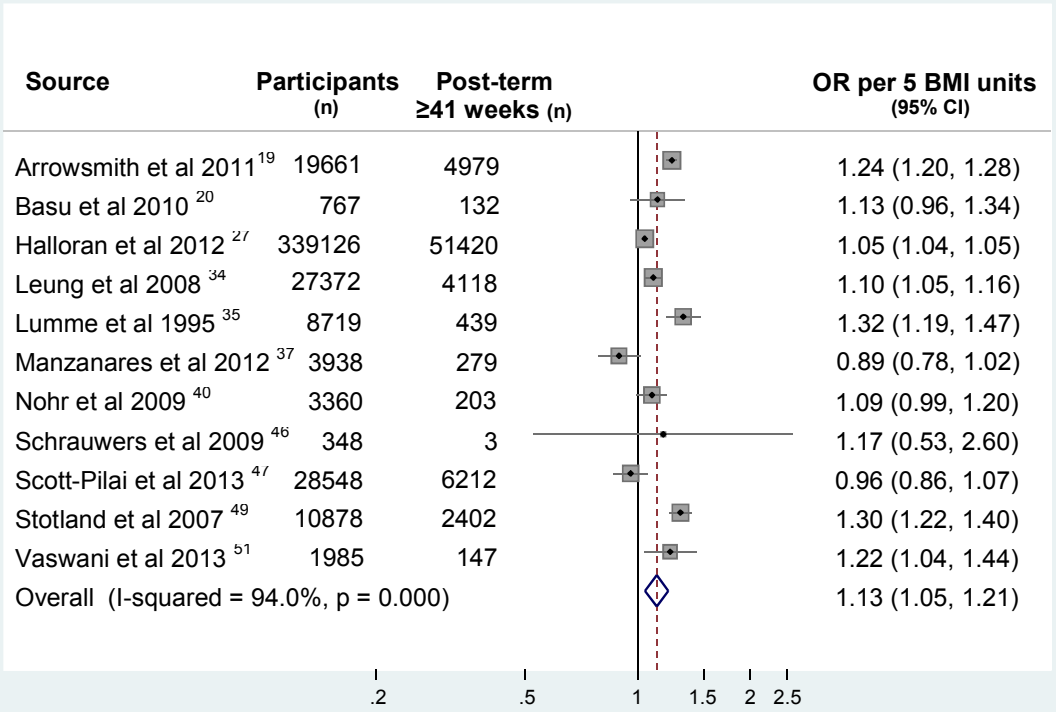


Figure S4b) Association between maternal BMI and post-term birth using General population BMI criteria for Leung et al[34]

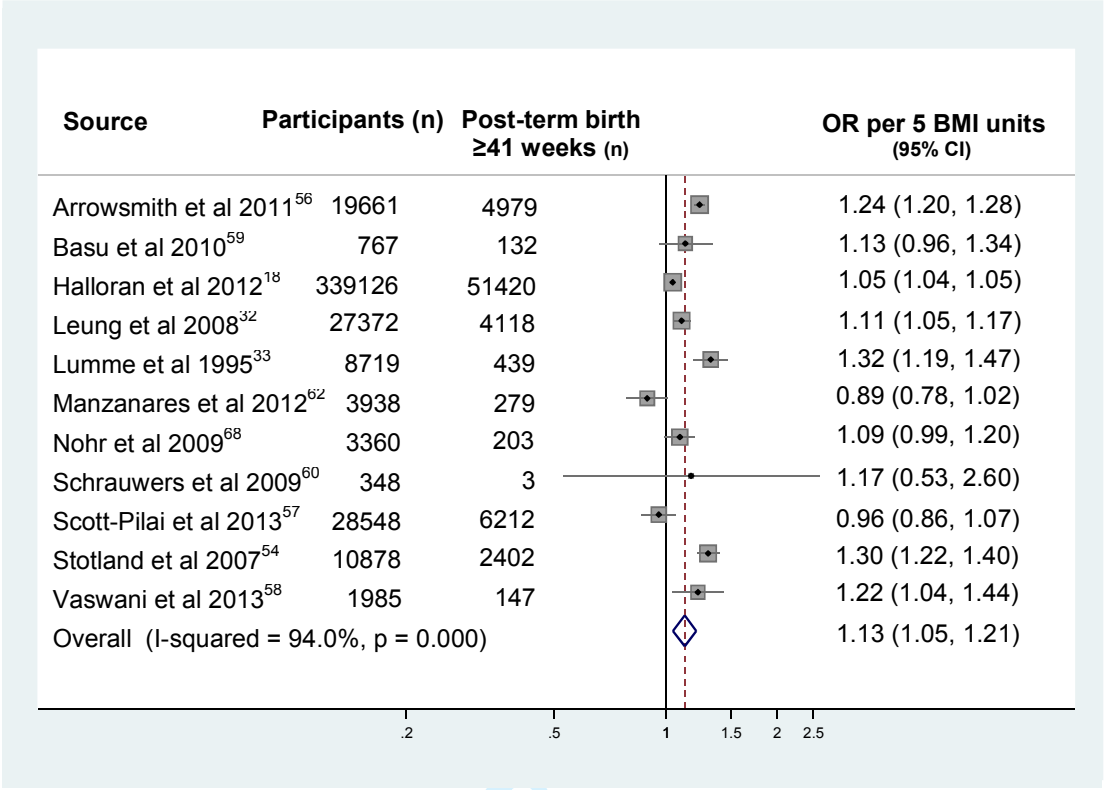


Figure legend: Sensitivity analysis exploring the influence of using the Asian-specific BMI criteria for the study by Leung et al [34] on the overall effect size (OR) and 95% confidence interval for the association between maternal BMI and post-term birth ≥41 weeks. Abbreviations: OR = odds ratio; BMI = body mass index; n = number of individuals; CI = confidence interval.

Table S6: Nonlinear meta-analyses using cubic splines regression

a) Post-term birth ≥42 weeks

Number of observations = 17

		Coef.	Std. err.	z	P	95% Confidence Interval	
Overall							
	spline1	0.0479	0.0096	5.00	<0.001	0.0291	0.0667
	spline2	-0.0302	0.0099	-3.06	0.002	-0.0495	-0.0108

b) Post-term birth ≥41 weeks

Number of observations = 11

		Coef.	Std. err.	z	P	95% Confidence Interval	
Overall							
	spline1	0.020952	0.007184	2.92	0.004	0.006873	0.0350315
	spline2	-0.003860	0.003193	-1.21	0.227	-0.010119	0.0023986

c) Post-term birth ≥41 weeks including Lumme et al[35]

Number of observations = 11

		Coef.	Std. err.	z	P	95% Confidence Interval	
Overall							
	spline1	0.03685	0.011754	3.14	0.002	0.013812	0.059888
	spline2	-0.04136	0.022377	-1.85	0.065	-0.08521	0.002503

Footnote: Nonlinearity was assessed by testing that the coefficient of the second spline was equal to zero.

Abbreviations: z = value for the z statistic
Coef. = coefficient
Std. Err. = Standard error
P = p-value

Table S7: Egger's test for publication bias for post-term birth (≥ 42 weeks and ≥41 weeks)

	Std_Eff	Coef.	Std. Err.	t	P	[95% Conf.	Interval]
≥ 42 weeks	slope	.1796733	.0287235	6.26	0.000	.119072	.2402747
	bias	-1.150876	2.149826	-0.54	0.599	-5.686613	3.38486
	Test of H0: no small-study effects P = 0.599, Number of studies = 19, Root MSE = 7.443						
≥ 41 weeks	slope	.0439365	.0175043	2.51	0.033	.004339	.083534
	bias	2.066102	1.355701	1.52	0.162	-1.000708	5.132911
	Test of H0: no small-study effects P = 0.162, Number of studies = 11, Root MSE = 3.768						

Footnote: Egger's test for small-study effects: Regression of the standard normal deviate of intervention effect estimate against its standard error.

Abbreviations: Std_Eff = standard normal deviate of intervention effect
Coef. = coefficient
Std. Err. = Standard error
t = t-statistics
P = p-value

Table S8: Maternal BMI and post-term birth ≥ 42 weeks sensitivity analysis

	Linear analyses OR (95% CI)	Nonlinear Analyses: BMI Midpoint (kg/m^2) OR (95% CI)						
Model	**5 BMI units**	**17.5**	**22.5**	**27.5**	**32.5**	**37.5**	**42.5**	**47.5**
Arora et al 2013 [18]	1.19 (1.12,1.27)	0.80 (0.74,0.87)	1	1.24 (1.15,1.34)	1.42 (1.28,1.58)	1.54 (1.37,1.73)	1.62 (1.42,1.85)	1.71 (1.46,1.99)
Bhattacharya et al 2007 [21]	1.19 (1.11,1.26)	0.81 (0.74,0.89)	1	1.24 (1.14,1.34)	1.41 (1.26,1.59)	1.55 (1.36,1.76)	1.65 (1.44,1.90)	1.76 (1.50,2.06)
Cedergren et al 2004 [24]	1.19 (1.11,1.28)	0.80 (0.72,0.89)	1	1.25 (1.14,1.38)	1.44 (1.25,1.66)	1.57 (1.34,1.85)	1.67 (1.40,2.00)	1.77 (1.44,2.17)
El-Gilani et al 2009 [26]	1.17 (1.10,1.25)	0.82 (0.73,0.89)	1	1.23 (1.14,1.32)	1.40 (1.26,1.56)	1.53 (1.36,1.72)	1.63 (1.45,1.84)	1.74 (1.54,1.97)
Halloran et al 2012 [27]	1.20 (1.14,1.27)	0.79 (0.75,0.83)	1	1.26 (1.21,1.32)	1.45 (1.36,1.55)	1.59 (1.45,1.75)	1.70 (1.48,1.94)	1.80 (1.48,1.94)
Johnson et al 1992 [28]	1.19 (1.12,1.27)	0.80 (0.74,0.88)	1	1.24 (1.15,1.34)	1.42 (1.27,1.58)	1.53 (1.36,1.73)	1.62 (1.42,1.85)	1.70 (1.46,1.99)
Kashan et al 2009 [29]	1.20 (1.12,1.28)	0.81 (0.74,0.89)	1	1.24 (1.14,1.34)	1.43 (1.27,1.60)	1.58 (1.38,1.80)	1.71 (1.48,1.97)	1.84 (1.56,2.17)
Kitiyodom et al 2008 [31]	1.16 (1.10,1.24)	0.83 (0.76,0.90)	1	1.21 (1.12,1.31)	1.37 (1.23,1.54)	1.50 (1.32,1.69)	1.59 (1.40,1.82)	1.69 (1.47,1.96)
Konje et al 1993 [33]	1.21 (1.14,1.28)	NA	NA	NA	NA	NA	NA	NA
Knight et al 2010 [32]	1.19 (1.12,1.26)	0.81 (0.74,0.87)	1	1.24 (1.15,1.34)	1.42 (1.27,1.58)	1.55 (1.37,1.75)	1.65 (1.44,1.89)	1.75 (1.49,2.04)
Morgan et al 2014 [38]	1.18 (1.12,1.26)	NA	NA	NA	NA	NA	NA	NA
Olesen et al 2006 [41]	1.19 (1.12,1.27)	0.80 (0.73,0.88)	1	1.25 (1.15,1.35)	1.43 (1.27,1.61)	1.55 (1.36,1.78)	1.65 (1.43,1.90)	1.74 (1.48,2.05)
Raatikainen et al 2006 [42]	1.19 (1.12,1.27)	0.80 (0.74,0.88)	1	1.24 (1.15,1.34)	1.42 (1.27,1.60)	1.55 (1.37,1.77)	1.67 (1.44,1.90)	1.76 (1.50,2.06)
Rode et al 2005 [44]	1.19 (1.12,1.26)	0.81 (0.74,0.89)	1	1.23 (1.14,1.33)	1.41 (1.26,1.58)	1.54 (1.36,1.75)	1.64 (1.43,1.89)	1.75 (1.49,2.05)
Roos et al 2010 [45]	1.17 (1.12,1.23)	0.81 (0.74,0.89)	1	1.23 (1.14,1.33)	1.40 (1.25,1.57)	1.51 (1.34,1.57)	1.60 (1.38,1.85)	1.68 (1.40,2.02)
Stotland et al 2007 [49]	1.18 (1.11,1.25)	0.81 (0.74,0.89)	1	1.23 (1.14,1.33)	1.40 (1.25,1.56)	1.52 (1.34,1.72)	1.61 (1.41,1.85)	1.71 (1.46,1.99)
Vinturache et al 2014 [52]	1.19 (1.12,1.26)	0.80 (0.74,0.88)	1	1.24 (1.15,1.34)	1.42 (1.27,1.59)	1.55 (1.37,1.76)	1.65 (1.44,1.89)	1.75 (1.50,2.05)
Voigt et al 2008 [53]	1.20 (1.12,1.28)	0.80 (0.73,0.87)	1	1.25 (1.15,1.35)	1.43 (1.28,1.60)	1.57 (1.37,1.80)	1.71 (1.45,2.02)	No data
Yazdani et al 2012 [54]	1.19 (1.12,1.27)	0.80 (0.74,0.87)	1	1.25 (1.15,1.35)	1.43 (1.28,1.60)	1.56 (1.38,1.77)	1.66 (1.45,1.91)	1.76 (1.50,2.06)

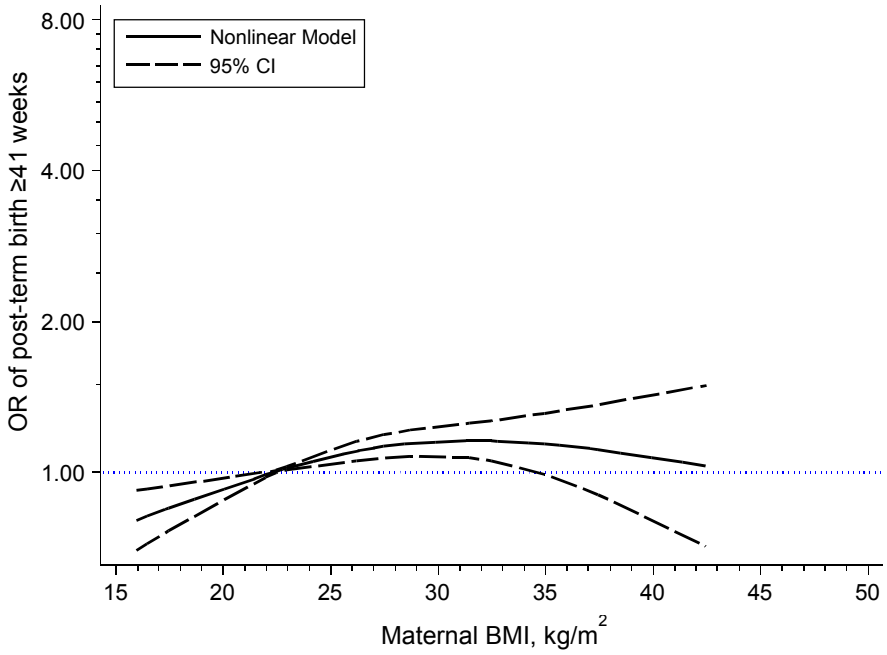
Footnote: Sensitivity analyses were performed by excluding one study at a time from the meta-analysis to identify the effect of any one individual study. The summary OR per 5 BMI units, obtained in the linear dose-response analysis, ranged from 1.16 (1.10,1.24) when the study by Kitiyodom et al[31] was removed to 1.20 (1.12,1.28) when either of the studies by Kashan et al[29] and Voigt et al[53] were excluded. Consistently, for the nonlinear analysis the lowest ORs for all overweight and obese BMI midpoints resulted from the exclusion of the study by Kitiyodom et al[31]. Abbreviations: NA = not applicable as study was excluded from nonlinear analysis for reporting only 2 BMI categories.

Table S9: Maternal BMI and post-term birth ≥ 41 weeks sensitivity analysis

	Linear analyses OR (95% CI)	Nonlinear Analyses: BMI Midpoint (kg/m^2) OR (95% CI)					
Model	**5 BMI units**	**17.5**	**22.5**	**27.5**	**32.5**	**37.5**	**42.5**
Arrowsmith et al 2011 [19]	1.10 (1.05,1.15)	0.87 (0.77,0.97)	1	1.08 (1.05,1.11)	1.05 (0.99,1.11)	0.94 (0.76,1.17)	0.82 (0.54,1.25)
Basu et al 2010 [20]	1.12 (1.05,1.18)	0.84 (0.75,0.94)	1	1.13 (1.07,1.19)	1.15 (1.04,1.26)	1.08 (0.87,1.34)	0.99 (0.67,1.45)
Halloran et al 2012 [27]	1.13 (1.04,1.22)	0.82 (0.73,0.92)	1	1.13 (1.07,1.20)	1.13 (0.98,1.30)	1.02 (0.73,1.41)	0.87 (0.50,1.54)
Leung et al 2008 [34]	1.12 (1.05,1.19)	0.84 (0.75,0.95)	1	1.13 (1.06,1.21)	1.17 (1.07,1.28)	1.12 (0.91,1.38)	1.04 (0.71,1.53)
Lumme et al 1995 [35]	**1.10 (1.04,1.16)**	**0.91 (0.85,0.97)**	**1**	**1.11 (1.04,1.20)**	**1.22 (1.07,1.39)**	**1.33 (1.10,1.59)**	**1.43 (1.13,1.83)**
Manzanares et al 2012 [37]	1.14 (1.07,1.21)	0.84 (0.76,0.94)	1	1.14 (1.08,1.21)	1.19 (1.09,1.31)	1.17 (0.95,1.43)	1.10 (0.76,1.60)
Nohr et al 2009 [40]	1.12 (1.05,1.19)	0.84 (0.75,0.93)	1	1.13 (1.07,1.20)	1.15 (1.05,1.27)	1.09 (0.87,1.35)	0.99 (0.66,1.46)
Schrauwers et al 2009 [46]	1.12 (1.05,1.18)	0.85 (0.76,0.94)	1	1.12 (1.07,1.19)	1.15 (1.05,1.27)	1.11 (0.90,1.36)	1.02 (0.71,1.49)
Scott-Pilai et al 2013 [47]	1.13 (1.05,1.22)	0.83 (0.74,0.94)	1	1.14 (1.06,1.22)	1.16 (1.01,1.32)	1.08 (0.83,1.43)	0.98 (0.61,1.57)
Stotland et al 2007 [49]	1.10 (1.04,1.17)	0.86 (0.76,0.96)	1	1.11 (1.07,1.16)	1.14 (1.07,1.22)	1.09 (0.89,1.34)	1.01 (0.69,1.50)
Vaswani et al 2013 [51]	1.11 (1.05,1.18)	0.84 (0.76,0.94)	1	1.12 (1.06,1.18)	1.14 (1.04,1.25)	1.08 (0.87,1.34)	0.98 (0.66,1.45)

Footnote: Sensitivity analyses were performed by excluding one study at a time from the meta-analysis to identify the effect of any one individual study. The summary OR per 5 BMI units, obtained in the linear dose-response analysis, ranged from 1.10 (1.04,1.16) when the study by Lumme et al[35] was excluded to 1.13 (1.05,1.22) when the study by Scott-Pilai et al[47] was excluded. In the nonlinear analysis, the biggest change on the ORs for all BMI midpoints occurr when excluding the study by Lumme et al[35] resulting in a linear association between maternal BMI and prolonged pregnancy (fig. S5).

Figure S5: Nonlinear dose-response analysis for maternal BMI and post-term birth ≥41 weeks, including all studies



Legend: Nonlinear meta-analysis for post-term ≥41 weeks when including Lumme et al[35] study data. Despite the nonlinear appearance of the graph, linearity is not rejected (p = 0.065, table S6).

Table S10: Meta-regression and sub-group results for post-term birth ≥ 42 weeks

Variable		Effect and Significance			Heterogeneity Results		
Sub-group	n studies	OR	Lower 95% CI	Upper 95% CI	Sub-group specific I^2 (%)	p value	Meta-regression I^2 (%)
All studies	19	1.18	1.11	1.26		<0.001	98.1
Clinical Factors							
Assessment of BMI							96.12
Self-reported	9	1.143	1.075	1.215	91.3	<0.001	
Measured	10	1.206	1.122	1.297	97.5	<0.001	
Unclear	0						
Assessment of Gestational Age							98.2
Self-reported (LMP)	2	1.377	0.964	1.967	88.2	0.004	
Measured (USS)	12	1.184	1.095	1.281	98.8	<0.001	
Unclear	5	1.09	1.068	1.113	0	0.76	
Induction of Labour or Caesarean Section - adjusted							94.63
Yes	3	1.301	1.289	1.313	0	0.651	
No	16	1.155	1.095	1.218	95.4	<0.001	
Parity - adjusted							93.79
Yes	4	1.237	1.154	1.325	98.3	<0.001	
No	13	1.129	1.071	1.191	87.4	<0.001	
Primiparous only	2	1.214	1.134	1.3	0	0.472	
Gestational diabetes - adjusted							96.85
Yes	4	1.196	0.952	1.503	87	<0.001	
No	14	1.188	1.12	1.259	97.4	<0.001	
Unclear	1	1.011	0.655	1.56			
Hypertension / Pre-eclampsia - adjusted							98.31
Yes	3	1.385	1.131	1.696	56.4	0.101	
No	15	1.161	1.086	1.24	98.6	<0.001	
Unclear	1	1.011	0.655	1.56			
Methodology/context of included studies							
Geographic location							96.79
Europe	11	1.148	1.079	1.222	97.9	<0.001	
North America	4	1.158	0.972	1.378	87.4	<0.001	
Asia	4	1.42	1.066	1.892	73.1	0.011	
Study Quality score							94.87
0-2	2	1.087	1.065	1.11	0	0.89	
3-5	15	1.168	1.098	1.242	95.7	<0.001	

Variable		Effect and Significance			Heterogeneity Results		
Sub-group	n studies	OR	Lower 95% CI	Upper 95% CI	Sub-group specific I^2 (%)	p value	Meta-regression I^2 (%)
6-8	2	1.301	1.289	1.313	0	0.528	
Study dimension							95.97
Local	6	1.19	0.988	1.432	86.5	<0.001	
Regional	8	1.133	1.059	1.212	86.4	<0.001	
National	5	1.181	1.093	1.275	98.8	<0.001	
Study start (per decade)							96.29
1970	1	1.219	1.138	1.307			
1980	3	1.018	0.813	1.274	84.3	0.002	
1990	6	1.203	1.125	1.287	98.5	<0.001	
2000	8	1.17	1.074	1.275	86.8	<0.001	
2010	1	1.011	0.655	1.56			
Type of study							98.22
Retrospective	13	1.185	1.108	1.267	98.8	<0.001	
Prospective	6	1.17	0.882	1.552	79.9	<0.001	
Sample Size							98.33
<1000	10	1.216	1.019	1.452	79.3	<0.001	
1000-<10000	4	1.204	1.145	1.267	48.7	0.119	
>=10000	5	1.122	1.016	1.239	99.6	<0.001	
Number of cases							98.33
<100	7	1.124	0.818	1.545	76.4	<0.001	
100-<1000	4	1.344	1.147	1.575	83	0.001	
1000-<10000	4	1.142	1.05	1.241	92.5	<0.001	
>10000	4	1.144	1.024	1.277	99.6	<0.001	
Number of Exposure Categories							75.95
2	2	1.095	0.373	3.213	86.9	0.006	
3	3	1.09	1.068	1.113	0	0.421	
4	4	1.282	1.211	1.358	29.9	0.233	
5	5	1.217	1.152	1.284	80.5	<0.001	
6	5	1.092	1.027	1.16	84.9	<0.001	
Methodology of this systematic review							
Publication Decade							98.18
1990s	2	0.896	0.515	1.559	91.4	0.001	
2000s	10	1.199	1.14	1.262	93.7	<0.001	
2010s	7	1.145	0.959	1.366	99.2	<0.001	
Study Identification							98.18
Citation Search	4	1.25	0.828	1.888	74.1	0.009	
Database Search	12	1.2	1.115	1.291	98.8	<0.001	
Reference List Search	3	1.029	0.885	1.196	83.5	0.002	
Adjustment of the odds ratios							93.8

Variable		Effect and Significance			Heterogeneity Results		
Sub-group	n studies	OR	Lower 95% CI	Upper 95% CI	Sub-group specific I^2 (%)	p value	Meta-regression I^2 (%)
Unadjusted	15	1.141	1.084	1.202	87.6	<0.001	
Adjusted	4	1.237	1.154	1.325	98.3	<0.001	

Footnote: Highlighted data show the results of the sub-group meta-analyses which resulted in a lack of statistically significant heterogeneity (I^2<75%, p>0.05) when three or more studies were included in the meta-analysis. Abbreviations*: n studies* = number of studies, *OR* = odds ratio, *Lower 95% CI* = lower limit of the 95% confidence interval, *Upper 95% CI* = upper limit of the 95% confidence interval, LMP = last menstrual period, USS = ultrasound scan

Table S11: Meta-regression and sub-group results for post-term birth ≥ 41 weeks

Variable / Sub-group	n studies	Effect and Significance: OR	Lower 95% CI	Upper 95% CI	Heterogeneity Results: Sub-group specific I^2 (%)	p value	Meta-regression I^2 (%)
All studies	11	1.13	1.06	1.21		<0.001	94
Clinical Factors							
Assessment of BMI							89.54
Self-reported	3	1.14	0.987	1.317	94.8	<0.001	
Measured	8	1.119	1.022	1.225	86.2	<0.001	
Not available	0						
Assessment of Gestational Age							94.3
Self-reported (LMP)	0						
Measured (USS)	4	1.176	1.036	1.335	97.8	<0.001	
Not available	7	1.09	0.989	1.201	79.6	<0.001	
Induction of Labour or Caesarean Section - adjusted							83.51
Yes	3	1.166	1.025	1.328	91.6	<0.001	
No	8	1.103	1.033	1.178	78.9	<0.001	
Parity - adjusted							83.51
Yes	3	1.166	1.025	1.328	91.6	<0.001	
No	8	1.103	1.033	1.178	78.9	<0.001	
Primiparous only	0						
Gestational diabetes - adjusted							94.86
Yes	5	1.145	1.024	1.281	97.2	<0.001	
No	5	1.104	0.947	1.287	81.2	<0.001	
Unclear	1	1.105	1.046	1.167			
Hypertension / Pre-eclampsia - adjusted							83.21
Yes	4	1.178	1.057	1.313	87.3	<0.001	
No	6	1.089	0.989	1.199	80.7	<0.001	
Unclear	1	1.105	1.046	1.167			
Methodology/context of included studies							
Geographic location							92.77
Europe	5	1.095	0.962	1.246	91.5	<0.001	
North America	2	1.164	0.938	1.444	97.4	<0.001	
Asia	2	1.129	1.041	1.224	27	0.242	
Africa	1	1.131	0.959	1.335			
Australia	1	1.172	0.528	2.602			
Study Quality score							85.32
0-2	1	1.172	0.528	2.602			
3-5	7	1.103	1.032	1.179	81.9	<0.001	
6-8	3	1.166	1.025	1.328	91.6	<0.001	
Study dimension							87.05

Variable		Effect and Significance			Heterogeneity Results		
Sub-group	n studies	OR	Lower 95% CI	Upper 95% CI	Sub-group specific I^2 (%)	p value	Meta-regression I^2 (%)
Local	7	1.151	1.058	1.252	84.1	<0.001	
Regional	2	1.169	0.928	1.474	94.6	<0.001	
National	1	1.093	0.995	1.2			
Study start (per decade)							94.18
1980	1	1.324	1.189	1.475			
1990	3	1.164	1.039	1.305	87	<0.001	
2000	6	1.054	0.948	1.172	95.5	<0.001	
2010	1	1.223	1.041	1.436			
Type of study							94.05
Retrospective	9	1.108	1.022	1.202	94.7	<0.001	
Prospective	2	1.201	0.994	1.45	85.7	0.008	
Sample Size							94.87
<1000	2	1.133	0.963	1.333	0	0.932	
1000-<10000	4	1.121	0.952	1.32	86.6	<0.001	
>=10000	5	1.127	1.021	1.244	97.1	<0.001	
Number of cases							87.19
<100	1	1.172	0.528	2.602			
100-<1000	5	1.123	0.982	1.284	82.1	<0.001	
1000-<10000	4	1.152	1.043	1.272	91.3	<0.001	
>10000	1	1.046	1.037	1.054			
Number of Exposure Categories							92.68
4	4	1.288	1.219	1.361	0	0.428	
5	2	1.129	1.041	1.224	27	0.242	
6	5	1.049	0.948	1.162	96.4	<0.001	
Methodology of this systematic review							
Publication Decade							93.51
1990s	1	1.324	1.189	1.475			
2000s	4	1.165	1.045	1.298	80.5	0.002	
2010s	6	1.074	0.972	1.186	95.6	<0.001	
Study Identification							94.23
Citation Search	1	0.893	0.784	1.017			
Database Search	8	1.132	1.046	1.224	95.2	<0.001	
Reference List Search	2	1.322	1.188	1.47	0	0.766	
Adjustment of the odds ratios							82.42
Unadjusted	7	1.091	1.020	1.168	79.8	<0.001	
Adjusted	4	1.178	1.057	1.313	87.3	<0.001	

Footnote: Highlighted data show the results of the sub-group meta-analyses which resulted in a lack of statistically significant heterogeneity (I^2<75%, p>0.05) when three or more studies were included in the meta-analysis. Abbreviations: *n studies* = number of studies, *OR* = odds ratio, *Lower 95% CI* = lower limit of the 95% confidence interval, *Upper 95% CI* = upper limit of the 95% confidence interval, LMP = last menstrual period, USS = ultrasound scan

Supporting Information References

1. Wells GA, Shea B, O'connell D, et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. 2000.
2. Bogaerts A, Witters I, Van den Bergh BRH, Jans G, Devlieger R. Obesity in pregnancy: Altered onset and progression of labour. *Midwifery.* 2013;29:1303-1313.
3. Castro LC, Avina RL. Maternal obesity and pregnancy outcomes. *Current Opinion in Obstetrics and Gynecology.* 2002;14(6):601-606.
4. Catalano PM, Ehrenberg HM. The short- and long-term implications of maternal obesity on the mother and her offspring. *BJOG: Int J Obstet Gynaecol.* 2006;113.
5. Caughey AB, Snegovskikh VV, Norwitz ER. Postterm pregnancy: how can we improve outcomes? *Obstetrical & gynecological survey.* 2008;63(11):715-724.
6. Gülmezoglu AM, Crowther CA, Middleton P, Heatley E. Induction of labour for improving birth outcomes for women at or beyond term. *Cochrane Database Syst Rev.* 2012;6(6).
7. Heslehurst N, Simpson H, Ells LJ, et al. The impact of maternal BMI status on pregnancy outcomes with immediate short-term obstetric resource implications: a meta-analysis. *Obesity Reviews.* 2008;9(6):635-683.
8. Linne Y. Effects of Obesity on Women's Reproduction and Complications During Pregnancy. *Obesity Reviews.* 2004;5:137-143.
9. Lutsiv O, Mah J, Beyene J, McDonald SD. The effects of morbid obesity on maternal and neonatal health outcomes: a systematic review and meta-analyses. *Obesity Reviews.* 2015;16(7):531-546.
10. McDonald SD, Han Z, Mulla S, Beyene J, on behalf of the Knowledge Synthesis Group. Overweight and obesity in mothers and risk of preterm birth and low birth weight infants: systematic review and meta-analyses. *British Medical Journal.* 2010;341:c3428.
11. Nuthalapaty FS, Rouse DJ. The impact of obesity on obstetrical practice and outcome. *Clinical obstetrics and gynecology.* 2004;47(4):898-913.
12. Torloni MR, Betran AP, Daher S, et al. Maternal BMI and preterm birth: A systematic review of the literature with meta-analysis. *The Journal of Maternal-Fetal and Neonatal Medicine.* 2009;22(11):957-970.
13. Vasudevan C, Renfrew M, McGuire W. Fetal and perinatal consequences of maternal obesity. *Archives of Disease in Childhood. Fetal and Neonatal Edition.* 2011;96(5).
14. Walker N, Gan JH. Prolonged pregnancy. *Obstetrics, Gynaecology and Reproductive Medicine.* 01 Mar 2015;25(3):83-87.
15. Wolfe H. High prepregnancy body-mass index - a maternal-fetal risk factor. *New England Journal of Medicine.* 1998;338(3):191.
16. Abenhaim HA, Kinch RA, Morin L, Benjamin A, Usher R. Effect of prepregnancy body mass index categories on obstetrical and neonatal outcomes. *Archives of Gynecology & Obstetrics.* 2007;275(1):39-43.
17. Al-Rayyan E, Shwayat R, AL-Sumadi A, et al. The Effect of High Maternal Body Mass Index before Pregnancy on Pregnancy Outcome. *Journal of the Royal Medical Services.* 2010;17(2):11-15.
18. Arora R, Arora D, Patumanond J. Adverse pregnancy outcomes in women with high pre-pregnancy body mass index. *Open Journal of Obstetrics and Gynecology.* 2013;3:285-291.
19. Arrowsmith S, Wray S, Quenby S. Maternal obesity and labour complications following induction of labour in prolonged pregnancy. *BJOG: An International Journal of Obstetrics and Gynaecology.* April 2011;118(5):578-588.
20. Basu JK, Jeketera CM, Basu D. Obesity and its outcomes among pregnant South African women. *International Journal of Gynecology and Obstetrics.* August 2010;110(2):101-104.
21. Bhattacharya S, Campbell DM, Liston WA, Bhattacharya S. Effect of Body Mass Index on pregnancy outcomes in nulliparous women delivering singleton babies. *BMC Public Health.* 2007;7:168.
22. Briese V, Voigt M, Wisser J, Borchardt U, S. S. Risks of pregnancy and birth in obese primiparous women: an analysis of German perinatal statistics. *Archives of Gynecology and Obstetrics.* 2011;283(2):249-253.
23. Caughey AB, Stotland NE, Washington AE, Escobar GJ. Who is at risk for prolonged and postterm pregnancy? *American Journal of Obstetrics and Gynecology.* June 2009;200(6):683.e681-683.e685.
24. Cedergren MI. Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstetrics & Gynecology.* 2004;103(2):219-224.
25. Denison FC, Price J, Graham C, Wild S, Liston WA. Maternal obesity, length of gestation, risk of postdates pregnancy and spontaneous onset of labour at term. *BJOG: An International Journal of Obstetrics and Gynaecology.* May 2008;115(6):720-725.

26. El-Gilany AH, Hammad S. Body mass index and obstetric outcomes in pregnant in Saudi Arabia: A prospective cohort study. *Annals of Saudi Medicine.* September-October 2010;30(5):376-380+421.
27. Halloran DR, Cheng YW, Wall TC, MacOnes GA, Caughey AB. Effect of maternal weight on postterm delivery. *Journal of Perinatology.* February 2012;32(2):85-90.
28. Johnson JW, Longmate JA, Frentzen B. Excessive maternal weight and pregnancy outcome. *American Journal of Obstetrics & Gynecology.* 1992;167(2):353-370; discussion 370-352.
29. Khashan AS, Kenny LC. The effects of maternal body mass index on pregnancy outcome. *European Journal of Epidemiology.* November 2009;24(11):697-705.
30. Kistka ZAF, Palomar L, Boslaugh SE, DeBaun MR, DeFranco EA, Muglia LJ. Risk for postterm delivery after previous postterm delivery. *American Journal of Obstetrics and Gynecology.* March 2007;196(3):241.e241-241.e246.
31. Kitiyodom S, Tongswatwong P. Pregnancy Outcomes of Parturients with Excessive-weight in Maharat Nakorn Ratchasima Hospital. *Thai Journal of Obstetrics and Gynaecology.* 2008;16 214-220.
32. Knight M, Kurinczuk JJ, Spark P, Brocklehurst P, System UKOS. Extreme obesity in pregnancy in the United Kingdom. *Obstetrics & Gynecology.* 2010;115(5):989-997.
33. Konje JC, Imrie A, Hay DM. Pregnancy in Obese Women. *Journal of Obstetrics and Gynaecology.* 1993;13:413-418.
34. Leung TY, Leung TN, Sahota DS, et al. Trends in maternal obesity and associated risks of adverse pregnancy outcomes in a population of Chinese women. *BJOG: An International Journal of Obstetrics & Gynaecology.* 2008;115(12):1529-1537.
35. Lumme R, Rantakallio P, Hartikainen AL, Jarvelin MR. Pre-pregnancy weight and it's relation to pregnancy outcome. *Obstetrics and Gynaecology.* 1995;15:69-75.
36. Mancuso A, D'Anna R, Leonardi R. Pregnancy in the obese patient. *European Journal of Obstetrics and Gynecology and Reproductive Biology.* 1991;39:83-86.
37. Sebastián Manzanares G, Ángel Santalla H, Irene Vico Z, López Criado MS, Alicia Pineda L, José Luis Gallo V. Abnormal maternal body mass index and obstetric and neonatal outcome. *The Journal of Maternal-Fetal & Neonatal Medicine.* 2012/03/01 2012;25(3):308-312.
38. Morgan KL, Rahman MA, Hill RA, et al. Physical Activity and Excess Weight in Pregnancy Have Independent and Unique Effects on Delivery and Perinatal Outcomes. *PLoS ONE.* 2014;9(4):e94532.
39. Navid S, Arshad S, Atif K, Arshad Meo R. Impact of high maternal body mass index on length of gestation and maternal delivery outcomes. *Rawal Medical Journal.* 2013;38(3):279-282.
40. Nohr EA, Timpson NJ, Andersen CS, Smith GD, Olsen J, Sorensen TIA. Severe obesity in young women and reproductive health: The danish national birth cohort. *PLoS ONE.* 2009;4(12).
41. Olesen AW, Westergaard JG, Olsen J. Prenatal risk indicators of a prolonged pregnancy. The Danish Birth Cohort 1998-2001. *Acta obstetricia et gynecologica Scandinavica.* 2006;85(11):1338-1341.
42. Raatikainen K, Heiskanen N, Heinonen S. Transition from Overweight to Obesity Worsens Pregnancy Outcome in a BMI-dependent Manner. *Obesity* 2006;14(1):165-171.
43. Robinson HE, O'Connell CM, Joseph KS, McLeod NL. Maternal outcomes in pregnancies complicated by obesity. *Obstetrics & Gynecology.* 2005;106(6):1357-1364.
44. Rode L, Nilas L, Wojdemann K, Tabor A. Obesity-related complications in Danish single cephalic term pregnancies. *Obstetrics & Gynecology.* 2005;105(3):537-542.
45. Roos N, Sahlin L, Ekman-Ordeberg G, Kieler H, Stephansson O. Maternal risk factors for postterm pregnancy and cesarean delivery following labor induction. *Acta Obstetricia et Gynecologica Scandinavica.* August 2010;89(8):1003-1010.
46. Schrauwers C, Dekker G. Maternal and perinatal outcome in obese pregnant patients. *Journal of Maternal-Fetal & Neonatal Medicine.* 2009;22(3):218-226.
47. Scott-Pillai R, Spence D, Cardwell CR, Hunter A, Holmes VA. The impact of body mass index on maternal and neonatal outcomes: A retrospective study in a UK obstetric population, 2004-2011. *BJOG: An International Journal of Obstetrics and Gynaecology.* July 2013;120(8):932-939.
48. Sharief M, Tarik A. Obesity in pregnancy. *Qatar Medical Journal.* 2000;9(2):48-50.
49. Stotland NE, Washington AE, Caughey AB. Prepregnancy body mass index and the length of gestation at term. *American Journal of Obstetrics and Gynecology.* October 2007;197(4):378.e371-378.e375.
50. Usha Kiran TS, Hemmadi S, Bethel J, Evans J. Outcome of pregnancy in a woman with an increased body mass index. *BJOG: An International Journal of Obstetrics & Gynaecology.* 2005;112(6):768-772.

51. Vaswani PR, Balachandran L. Pregnancy outcomes in a population with high prevalence of obesity: How bad is it? *Clinical Epidemiology and Global Health.* April 2013;1(1):5-11.
52. Vinturache A, Moledina N, McDonald S, Slater D, Tough S. Pre-pregnancy Body Mass Index (BMI) and delivery outcomes in a Canadian population. *BMC Pregnancy and Childbirth.* 2014;14(1):1-10.
53. Voigt M, Zygmunt M, Henrich W, Straube S, Carstensen M, V. B. Analysis of subgroup of pregnant women in Germany. *Geburtsh Frauenheilk. 16th communication: morbid obesity: pregnancy risks, birth risks and status of the newborn.* 2008;68:794-800.
54. Yazdani S, Yosofniyapasha Y, Nasab BH, Mojaveri MH, Bouzari Z. Effect of maternal body mass index on pregnancy outcome and newborn weight. *BMC Research Notes.* 2012;5(1):1-4.

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Nicola
2. Surname (Last Name): Heslehurst
3. Date: 26-July-2016

4. Are you the corresponding author? ☑ Yes ☐ No

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Dr. Heslehurst has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Rute
2. Surname (Last Name): Vieira
3. Date: 26-July-2016

4. Are you the corresponding author? ☐ Yes ☑ No

Corresponding Author's Name: Nicola Heslehurst

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Dr. Vieira has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Louise
2. Surname (Last Name): Hayes
3. Date: 27-July-2016

4. Are you the corresponding author? ☐ Yes ☑ No
Corresponding Author's Name: Nicola Heslehurst

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Dr. Hayes has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Lisa
2. Surname (Last Name): Crowe
3. Date: 27-July-2016

4. Are you the corresponding author? ☐ Yes ☑ No
Corresponding Author's Name: Nicola Heslehurst

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Dr. Crowe has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Dan
2. Surname (Last Name): Jones
3. Date: 27-July-2016

4. Are you the corresponding author? ☐ Yes ☑ No
Corresponding Author's Name: Nicola Heslehurst

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Mr. Jones has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Shannon
2. Surname (Last Name): Robalino
3. Date: 27-July-2016

4. Are you the corresponding author? ☐ Yes ☑ No

Corresponding Author's Name: Nicola Heslehurst

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Ms. Robalino has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Emma
2. Surname (Last Name): Slack
3. Date: 27-July-2016

4. Are you the corresponding author? ☐ Yes ☑ No
Corresponding Author's Name: Nicola Heslehurst

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Ms. Slack has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Instructions

The purpose of this form is to provide readers of your manuscript with information about your other interests that could influence how they receive and understand your work. The form is designed to be completed electronically and stored electronically. It contains programming that allows appropriate data display. Each author should submit a separate form and is responsible for the accuracy and completeness of the submitted information. The form is in six parts.

1. Identifying information.

2. The work under consideration for publication.

This section asks for information about the work that you have submitted for publication. The time frame for this reporting is that of the work itself, from the initial conception and planning to the present. The requested information is about resources that you received, either directly or indirectly (via your institution), to enable you to complete the work. Checking "No" means that you did the work without receiving any financial support from any third party -- that is, the work was supported by funds from the same institution that pays your salary and that institution did not receive third-party funds with which to pay you. If you or your institution received funds from a third party to support the work, such as a government granting agency, charitable foundation or commercial sponsor, check "Yes".

3. Relevant financial activities outside the submitted work.

This section asks about your financial relationships with entities in the bio-medical arena that could be perceived to influence, or that give the appearance of potentially influencing, what you wrote in the submitted work. You should disclose interactions with ANY entity that could be considered broadly relevant to the work. For example, if your article is about testing an epidermal growth factor receptor (EGFR) antagonist in lung cancer, you should report all associations with entities pursuing diagnostic or therapeutic strategies in cancer in general, not just in the area of EGFR or lung cancer.

Report all sources of revenue paid (or promised to be paid) directly to you or your institution on your behalf over the 36 months prior to submission of the work. This should include all monies from sources with relevance to the submitted work, not just monies from the entity that sponsored the research. Please note that your interactions with the work's sponsor that are outside the submitted work should also be listed here. If there is any question, it is usually better to disclose a relationship than not to do so.

For grants you have received for work outside the submitted work, you should disclose support ONLY from entities that could be perceived to be affected financially by the published work, such as drug companies, or foundations supported by entities that could be perceived to have a financial stake in the outcome. Public funding sources, such as government agencies, charitable foundations or academic institutions, need not be disclosed. For example, if a government agency sponsored a study in which you have been involved and drugs were provided by a pharmaceutical company, you need only list the pharmaceutical company.

4. Intellectual Property.

This section asks about patents and copyrights, whether pending, issued, licensed and/or receiving royalties.

5. Relationships not covered above.

Use this section to report other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work.

Definitions.

Entity: government agency, foundation, commercial sponsor, academic institution, etc.
Grant: A grant from an entity, generally [but not always] paid to your organization
Personal Fees: Monies paid to you for services rendered, generally honoraria, royalties, or fees for consulting , lectures, speakers bureaus, expert testimony, employment, or other affiliations
Non-Financial Support: Examples include drugs/equipment supplied by the entity, travel paid by the entity, writing assistance, administrative support, etc.
Other: Anything not covered under the previous three boxes
Pending: The patent has been filed but not issued
Issued: The patent has been issued by the agency
Licensed: The patent has been licensed to an entity, whether earning royalties or not
Royalties: Funds are coming in to you or your institution due to your patent

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 1. Identifying Information

1. Given Name (First Name): Judith
2. Surname (Last Name): Rankin
3. Date: 26-July-2016

4. Are you the corresponding author? ☐ Yes ☑ No
Corresponding Author's Name: Nicola Heslehurst

5. Manuscript Title: Maternal body mass index and post-term birth: a systematic review and meta-analysis

6. Manuscript Identifying Number (if you know it):

Section 2. The Work Under Consideration for Publication

Did you or your institution **at any time** receive payment or services from a third party (government, commercial, private foundation, etc.) for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.)?

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 3. Relevant financial activities outside the submitted work.

Place a check in the appropriate boxes in the table to indicate whether you have financial relationships (regardless of amount of compensation) with entities as described in the instructions. Use one line for each entity; add as many lines as you need by clicking the "Add +" box. You should report relationships that were **present during the 36 months prior to publication**.

Are there any relevant conflicts of interest? ☐ Yes ☑ No

Section 4. Intellectual Property -- Patents & Copyrights

Do you have any patents, whether planned, pending or issued, broadly relevant to the work? ☐ Yes ☑ No

ICMJE INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

ICMJE Form for Disclosure of Potential Conflicts of Interest

Section 5. Relationships not covered above

Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?

☐ Yes, the following relationships/conditions/circumstances are present (explain below):

☑ No other relationships/conditions/circumstances that present a potential conflict of interest

At the time of manuscript acceptance, journals will ask authors to confirm and, if necessary, update their disclosure statements. On occasion, journals may ask authors to disclose further information about reported relationships.

Section 6. Disclosure Statement

Based on the above disclosures, this form will automatically generate a disclosure statement, which will appear in the box below.

Prof. Rankin has nothing to disclose.

Evaluation and Feedback

Please visit http://www.icmje.org/cgi-bin/feedback to provide feedback on your experience with completing this form.